

SAFETY.CAT.COM™

MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

Operation and Maintenance Manual

446B Backhoe Loader

5BL1-Up (Machine)

i00090069

Maintenance Interval Schedule

SMCS Code: 7000

Note: All safety information, warnings, and instructions must be read and understood before you perform any operation or any maintenance procedure.

Before each consecutive interval is performed, all of the maintenance requirements from the previous interval must also be performed.

When Required

Battery - Recycle	102
Battery Electrolyte Level - Check	102
Battery or Battery Cable - Replace	103
Bucket Cutting Edges - Inspect/Replace	104
Bucket Tips - Inspect/Replace	104
Ether Starting Aid Cylinder - Replace	105
Fuel System - Prime	105
Fuel Tank Cap and Strainer - Clean	106
Fuses - Replace	106
Oil Filter - Inspect	107
Radiator Core - Clean	108
Windshield Wipers - Inspect/Replace	108

Every 10 Service Hours or Daily

Axle Oscillation Bearings - Lubricate	109
Backhoe Boom, Stick, Bucket, and Cylinder Bearings - Lubricate	109
Backup Alarm - Test	110
Braking System - Test	111
Cooling System Level - Check	112
Engine Air Filter Primary Element - Clean/Replace	113
Engine Air Filter Secondary Element - Replace ..	114
Engine Air Filter Service Indicator - Inspect	115
Engine Air Precleaner - Clean	116
Engine Oil Level - Check	116
Hydraulic System Oil Level - Check	117
Loader Bucket, Cylinder, and Linkage Bearings - Lubricate	118
Seat Belt - Inspect	119
Secondary Steering Test	119
Stabilizer and Cylinder Bearings - Lubricate	120
Swing Frame and Cylinder Bearings - Lubricate ..	120
Tire Inflation - Check	121
Transmission Oil Level - Check	121
Walk-Around Inspection	122
Wheel Nut Torque - Check	123
Windows - Clean	123

Every 50 Service Hours or Weekly

Axle Universal Joint (Front) - Lubricate	124
Cab Air Filter - Clean/Replace	124
Kingpin Bearings - Lubricate	126

Parking Brake - Check/Adjust	126
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Every 100 Service Hours or 2 Weeks

Engine Oil and Filter - Change	127
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Initial 250 Service Hours

Engine Valve Lash and Fuel Injector Timing - Check	129
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Every 250 Service Hours or Monthly

Engine Oil and Filter - Change	127
Air Conditioner - Test	129
Air Conditioner Belt - Inspect/Adjust/Replace	130
Alternator and Fan Belts - Inspect/Adjust/Replace	131
Cooling System Coolant Additive (DEAC) - Add ..	132
Differential Oil Level (Front) - Check	133
Differential Oil Level (Rear) - Check	133
Extendable Stick - Inspect	134
Final Drive Oil Level (Front) - Check	134
Water Pump Belt - Inspect/Adjust/Replace	135

Every 500 Service Hours or 3 Months

Drive Shaft Spline - Lubricate	135
Drive Shaft Universal Joint - Lubricate	136
Fuel System Primary Filter - Replace	136
Fuel System Secondary Filter - Replace	137
Hydraulic System Oil Filter - Replace	138
Transmission Oil Filter - Replace	139

Every 1000 Service Hours or 6 Months

Differential Oil (Front) - Change	140
Differential Oil (Rear) - Change	140
Engine Crankcase Breather - Clean	141
Final Drive Oil (Front) - Change	142
Rollover Protective Structure (ROPS) - Inspect ..	142
Transmission Magnetic Screen - Clean	143
Transmission Oil - Change	143
Wheel Bearings (Front) - Lubricate	144

Every 2000 Service Hours or 1 Year

Engine Valve Lash and Fuel Injector Timing - Check	129
Engine Governor Screen - Inspect/Clean/Replace	145
Hydraulic System Oil - Change	146

Every 3000 Service Hours or 2 Years

Cooling System Coolant (DEAC) - Change	147
Cooling System Coolant Extender (ELC) - Add ..	148
Cooling System Water Temperature Regulator - Clean/Replace	149

Every 6000 Service Hours or 4 Years

Cooling System Coolant (ELC) - Change 150

i00037658

Battery - Recycle

SMCS Code: 1401

1. Always recycle a battery. Never discard a battery.
2. Always return used batteries to one of the following locations.
 - A battery supplier
 - An authorized battery collection facility
 - Recycling facility

i00080782

Battery Electrolyte Level - Check

SMCS Code: 1401

Table 28

THE TABLE FOR THE BATTERY ELECTROLYTE	
Battery	Interval
Conventional	100 Hours
Low Maintenance	250 Hours
Maintenance Free	Maintenance Free

Tighten the battery retainers on all of the machines. Tighten the battery retainers at every 1000 hours.

Check the following items at every 1000 hours. If necessary, check the following items more often.

- Clean the top of the batteries with a clean cloth.
- Clean the battery terminals. As needed, coat the battery terminals with petroleum jelly.

A battery should not require more than 30 cc (1 oz) of water per cell per week. This should exist with the proper charging rate and with a moderate climate.

In extreme temperatures, check the water in the cells weekly.



Illustration 155

g00104990

1. Open the battery access cover that is located on the right side of the machine.
2. Clean the battery surface with a clean cloth. Keep the terminals clean and keep the terminals coated with petroleum jelly. Install the post cover after you coat the post with petroleum jelly.

i00080792

3. Inspect the electrolyte level in each battery cell. A maintenance free battery does not require inspection. Maintain the electrolyte level to the bottom of the filler openings. Use distilled water. If distilled water is not available, use clean drinking water.
4. Close the battery access cover.

Battery or Battery Cable - Replace

SMCS Code: 1401

1. Turn the engine start switch to the OFF position. Turn all switches to the OFF position.
 2. Remove the fuse for secondary steering when the machine is equipped with **9R-6221** Secondary Steering Attachment.
 3. Disconnect the negative battery cable from the frame.
- Note:** Do not allow the disconnected battery cable to contact the frame of the machine.
4. Disconnect the negative battery cable at the battery.
 5. Perform the necessary repairs. Replace the cable or the battery, as needed.
 6. Connect the negative battery cable at the battery.
 7. Connect the battery cable to the frame of the machine.
 8. Install the fuse for secondary steering.
 9. Install the engine start switch key.

i00058453

Bucket Cutting Edges - Inspect/Replace

SMCS Code: 6801

WARNING

Personal injury or death can result from bucket falling.

Block the bucket before changing bucket cutting edges.

1. Raise the bucket. Place a block under the bucket.
2. Lower the bucket to the blocking.

Do not block up the bucket too high. Block up the bucket so that the bucket is high enough to remove the cutting edges and the end bits.
3. Remove the bolts. Remove the cutting edge and the end bits.
4. Clean the contact surfaces.
5. Use the opposite side of the cutting edge, if this side is not worn.
6. Install a new cutting edge, if both edges are worn.
7. Install the bolts. Tighten the bolts to the specified torque. Refer to Operation and Maintenance Manual, "Torques for Ground Engaging Tool Bolts".
8. Raise the bucket. Remove the blocks.
9. Lower the bucket to the ground.
10. After a few hours of operation, check the bolts for proper torque.

i00081131

Bucket Tips - Inspect/Replace

SMCS Code: 6805

WARNING

Block the bucket before changing the bucket teeth.

To prevent possible injury to the eyes, wear a protective face shield when striking the pin.

The pin, when struck, can fly out and cause injury to nearby personnel.

1. Drive the pin out of the bucket tip from the retainer side of the bucket tip. Remove the bucket tip and the retainer.
2. Clean the adapter, the pin, and the retainer. Replace any damaged parts. Install the retainer in the groove.
3. The bucket tip should be installed over the retainer. Install the bucket tip in the runner position or in the digger position.
4. Drive the pin through the retainer, through the adapter, and through the bucket tip from the side that is opposite the retainer.

i00081566

Ether Starting Aid Cylinder - Replace

SMCS Code: 1456; 7528



Illustration 156

g00104955

1. Remove the engine access panel on the right side of the machine.

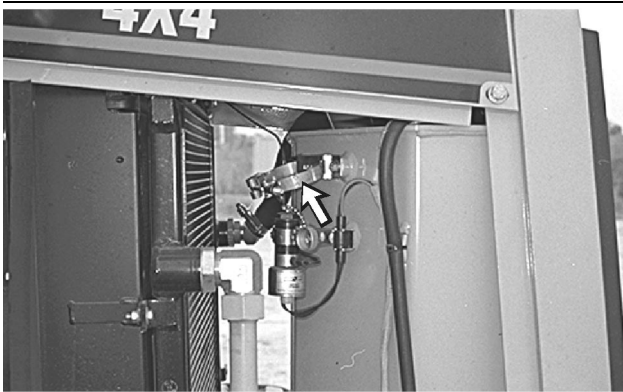


Illustration 157

g00105129

2. Loosen the cylinder retaining clamp. Unscrew the empty ether starting aid cylinder and remove the empty ether starting aid cylinder.
3. Remove the used gasket. Install the new gasket that is provided with each new ether starting aid cylinder.
4. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder hand tight. Tighten the cylinder retaining clamp securely.
5. Replace the engine access panel.

i00081584

Fuel System - Prime

SMCS Code: 1258

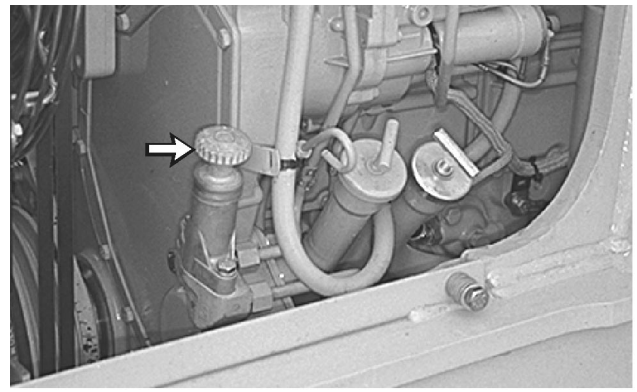


Illustration 158

g00105139

1. Unlock the priming pump plunger and operate the pump.
2. Operate the pump and listen for the fuel to flow into the fuel tank. Close the pump and lock the priming pump plunger.
3. Start the engine and check for leaks.

If the engine fails to start, repeat Steps 1 through 3.

i00081586

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273



Illustration 159

g00105168

The fuel tank cap is located on the left side of the machine.

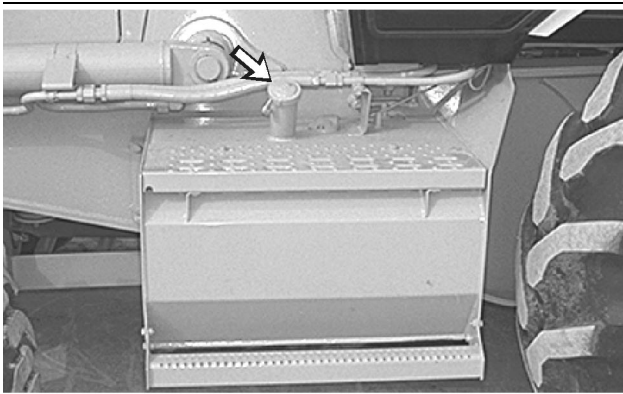


Illustration 160

g00105169

1. Remove the fuel tank cap.
2. Inspect the gasket for damage. Replace the fuel tank cap, if necessary.
3. Remove the strainer from the filler opening.
4. Inspect the strainer for damage. Replace the strainer, if necessary.
5. Use a clean, nonflammable solvent to wash the strainer and the fuel tank cap.
6. Install the strainer.
7. Install the fuel tank cap.

i00089307

Fuses - Replace

SMCS Code: 1417



Illustration 161

g00107649

Move the latch and open the panel cover in order to access the fuse panel.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Replace the fuse if the element separates. If the element of a new fuse separates, check the circuit. Repair the circuit, if necessary.

NOTICE

Replace the fuses with the same type and size only. Otherwise, electrical damage can result.

If it is necessary to replace fuses frequently, an electrical problem may exist. Contact your Caterpillar dealer.

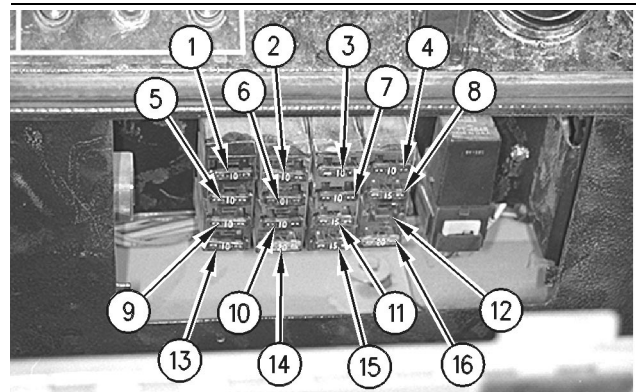


Illustration 162

g00107650

All Wheel Drive and Transmission Neutralizer (1) – 10 Amp

Transmission Control (2) – 10 Amp

Right Turn Signal (3) – 10 Amp

Front Windshield Wiper (4) – 10 Amp

i00052234

Horn and Return to Dig (5) – 10 Amp

Rotating Beacon (6) – 10 Amp

Left Turn Signal (7) – 10 Amp

Rear Windshield Wiper (8) – 15 Amp

Gauges (9) – 10 Amp

Instrument Panel Lights (10) – 10 Amp

Key Switch (11) – 15 Amp

Spare (12) – Open

Front Work Lights (13) – 10 Amp

Rear Work Lights (14) – 20 Amp

Hazard Flashers (15) – 15 Amp

Blowers (16) – 20 Amp

Oil Filter - Inspect

SMCS Code: 1318; 3067; 5068

Inspect A Used Filter for Debris

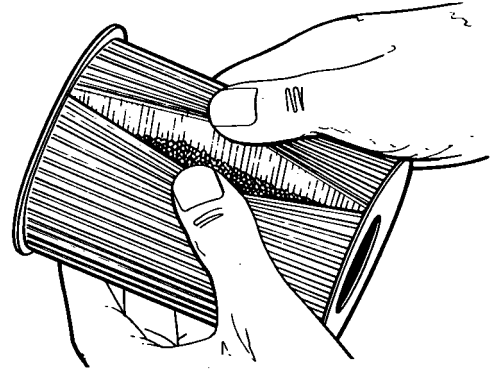


Illustration 163

g00100013

The element is shown with debris.

Use a **4C-5084** Filter Cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i00094900

Radiator Core - Clean

SMCS Code: 1353



Illustration 164

g00105056

1. Remove both of the engine access panels in order to access the radiator core.

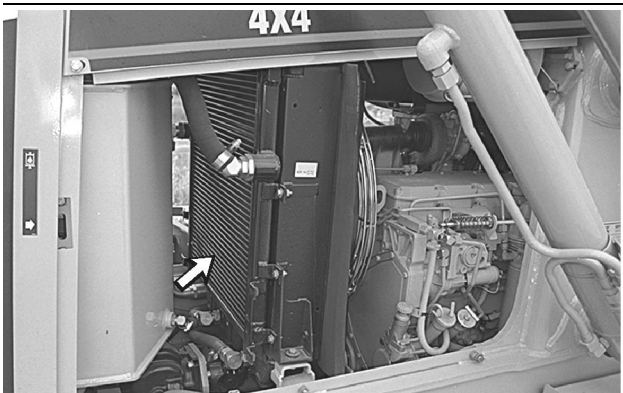


Illustration 165

g00107908

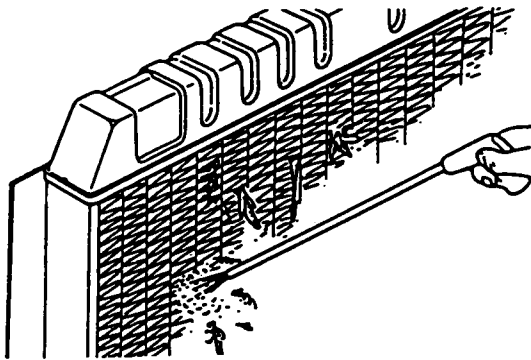


Illustration 166

g00101939

2. You can use compressed air, high pressure water, or steam to remove dust and other debris from the radiator fins. However, the use of compressed air is preferred.
3. Replace the engine access panels.

i00058886

Windshield Wipers - Inspect/Replace

SMCS Code: 7305

Inspect the condition of the windshield wiper blades. Replace the windshield wiper blades if the windshield wiper blades are worn or damaged. If the windshield wiper blades streak the windshield, replace the windshield wiper blades .

i00079835

Axle Oscillation Bearings - Lubricate

SMCS Code: 3278; 3282



Illustration 167

g00104961



Illustration 168

g00104960

Apply lubricant to the two remote grease fittings for the trunnion bearings.

i00079849

Backhoe Boom, Stick, Bucket, and Cylinder Bearings - Lubricate

SMCS Code: 6501; 6502; 6503; 6510; 6511; 6512; 6513; 6533



Illustration 169

g00104983

Position the backhoe into the service position.

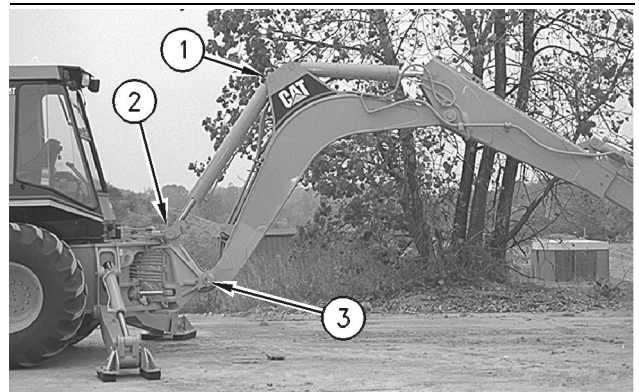


Illustration 170

g00104962

Apply lubricant to the grease fitting for the head end of the boom cylinder (1). Apply lubricant to the grease fitting for the rod end of the boom cylinder (2).

Apply lubricant to the grease fitting for the boom pivot (3). There is one grease fitting on each side of the machine.

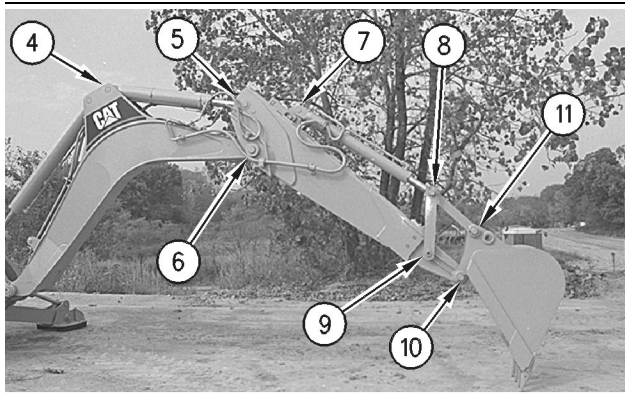


Illustration 171

g00104963

Apply lubricant to the grease fitting for the head end of the stick cylinder (4). Apply lubricant to the grease fitting for the rod end of the stick cylinder (5).

Apply lubricant to the grease fitting for the pivot pin for the stick (6).

Apply lubricant to the grease fitting for the head end of the bucket cylinder (7). Apply lubricant to the grease fitting for the rod end of the bucket cylinder (8).

Apply lubricant to the grease fitting for the pivot pin (9). There is one grease fitting on each side of the machine.

Apply lubricant to the grease fitting for the bucket pivot pin (10).

Apply lubricant to the grease fitting for the link (11).

There is a total of thirteen grease fittings.

Backup Alarm - Test

SMCS Code: 7406

Turn the engine start switch key to ON in order to perform the test.

Apply the service brake. Move the transmission direction control lever to REVERSE position.

The backup alarm should immediately sound. The backup alarm will continue to sound until the transmission direction control lever is moved to the NEUTRAL position or to the FORWARD position.

i00080882

Braking System - Test

SMCS Code: 4251; 4267

Service Brake Holding Ability Test

Check the area around the machine. Make sure that the machine is clear of personnel and clear of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The following tests are used to determine if the service brake is functional. These tests are not intended to measure the maximum brake holding effort. The brake holding effort that is required to sustain a machine at a specific engine rpm varies depending on the machine. The variations are the differences in the engine setting, in the power train efficiency, and in the brake holding ability, etc.

1. Start the engine. Raise the bucket slightly.
2. Apply the service brake. Release the parking brake.
3. Move the transmission control lever to FOURTH SPEED FORWARD.
4. Gradually increase the engine speed to high idle. The machine should not move.

WARNING

If the machine begins to move, reduce the engine speed immediately and engage the parking brake.

5. Reduce the engine speed to low idle. Move the transmission to NEUTRAL. Engage the parking brake. Lower the bucket to the ground. Stop the engine.

NOTICE

If the machine moved while testing the brakes, contact your Caterpillar dealer. Have the dealer inspect and, if necessary, repair the service brake before returning the machine to operation.

Secondary Brake Holding Ability Test

Check the area around the machine. Make sure that the machine is clear of personnel and clear of obstacles.

Test the brakes on a dry, level surface.

Fasten the seat belt before you test the brakes.

The following tests are used to determine if the parking brake is functional. These tests are not intended to measure the maximum brake holding effort. The brake holding effort that is required to sustain a machine at a specific engine rpm varies depending on the machine. The variations are the differences in the engine setting, in the power train efficiency, and in the brake holding ability, etc.

1. Start the engine. Raise the bucket slightly.
2. Engage the parking brake.
3. Move the transmission control lever to FOURTH SPEED FORWARD.

Note: The parking brake indicator light should come on and the parking brake alarm should sound.

4. Gradually increase the engine speed to high idle. The machine should not move.

WARNING

If the machine begins to move, reduce the engine speed immediately and apply the service brake pedal.

5. Reduce the engine speed. Move the transmission to NEUTRAL. Lower the bucket to the ground. Stop the engine.

NOTICE

If the machine moved while testing the brakes, contact your Caterpillar dealer.

Have the dealer inspect and, if necessary, repair the parking brakes before returning the machine to operation.

i00081340

4. Install the radiator cap. Close the access panel.

Cooling System Level - Check

SMCS Code: 1353; 1395

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.



Illustration 172

g00105008

Open the access panel on the top of the engine compartment.

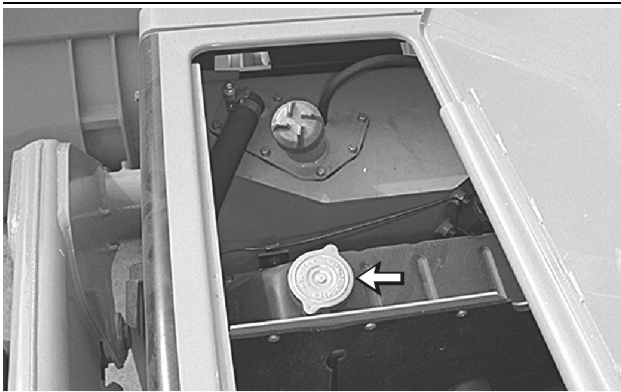


Illustration 173

g00105009

1. The radiator cap is located on the top of the radiator on the left side of the machine. Remove the radiator cap slowly in order to relieve system pressure.
2. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the filler tube. If you need to add coolant daily, check the cooling system for leaks.
3. Inspect the radiator cap seal. Replace the radiator cap seal if the radiator cap seal is damaged.

i00081499

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1051; 1054

NOTICE

Never service the air cleaner when the engine is running, to avoid engine damage.

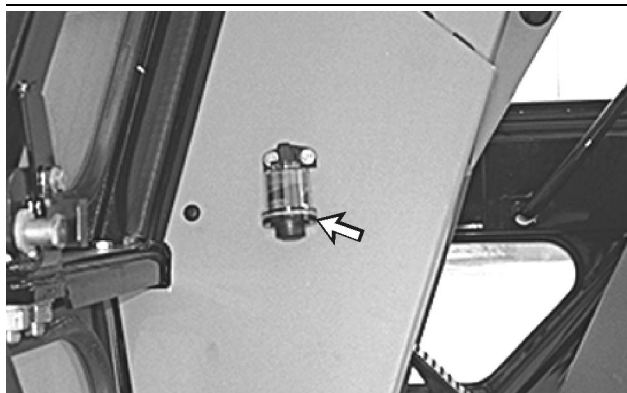


Illustration 174

g00105046

Service the air cleaner filter elements when the yellow piston enters the red zone.

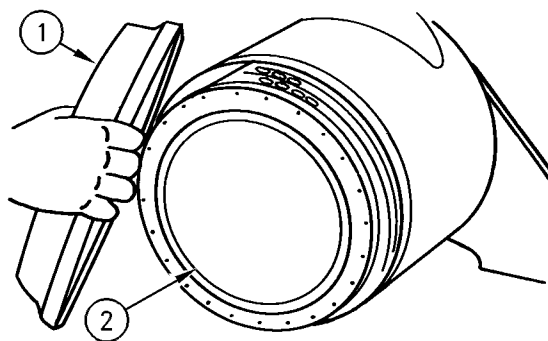


Illustration 175

g00101864

1. Remove the air cleaner housing cover (1).
2. Remove the primary filter element 2 from the air cleaner housing.

NOTICE

Do not clean the filter elements by bumping or tapping them. Do not use filter elements with damaged pleats, gaskets or seals. Engine damage can result.

Make sure the cleaned filter elements are completely dry before installing into the filter housing. Water remaining in the elements can cause false indications of contamination in Scheduled Oil Sampling test results.

3. Clean the primary filter element.

The filter elements can be cleaned by using the following methods:

- pressure air
- pressure water
- detergent washing

When you use pressure air, the maximum air pressure is 205 kPa (30 psi). When you use pressure water, the maximum water pressure is 280 kPa (40 psi).

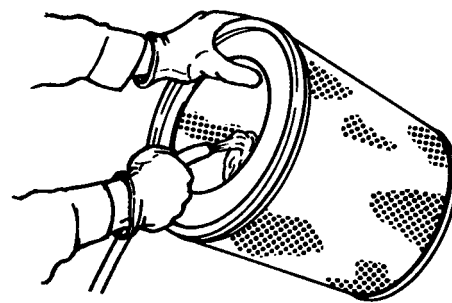


Illustration 176

g00038608

- a. When you clean the inside pleats and the outside pleats, direct the air along the pleats or direct the water along the pleats.

The element can be washed in a solution that consists of warm water and of nonsudsing household detergent. Fully rinse the pleats. Allow the filter to air dry completely.

- b. Inspect the filter elements after you clean the filter elements. Do not use a filter if the pleats, the gaskets or the seals are damaged.
- c. Cover the clean filter elements. Store the elements in a clean, dry location.

Replace the primary element after the primary element has been cleaned six times. Also replace the primary element if the primary element has been in service for one year.

4. Install a clean filter element and install the cover.
5. Tighten the cover screws finger tight. Do not use a tool to tighten the cover screws.

i00081511

Engine Air Filter Secondary Element - Replace

SMCS Code: 1051; 1054

NOTICE

Always replace the secondary filter element. Never attempt to reuse it by cleaning.

The secondary filter element should be replaced at the time the primary element is serviced for the third time.

The secondary filter element should also be replaced if the yellow piston in the filter element indicator enters the red zone after installation of a clean primary element, or if the exhaust smoke is still black.



Illustration 177

g00105056

1. Remove the engine access panel on the left side of the machine.

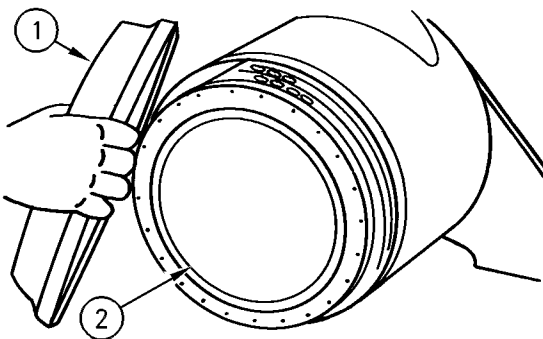


Illustration 178

g00101864

2. Remove the air cleaner housing cover (1).
3. Remove the primary filter element (2) from the air cleaner housing.

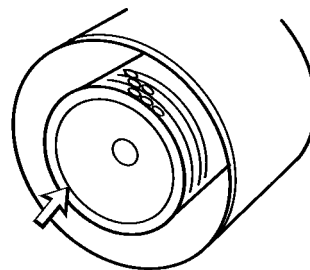


Illustration 179

g00038606

4. Remove the secondary filter element.

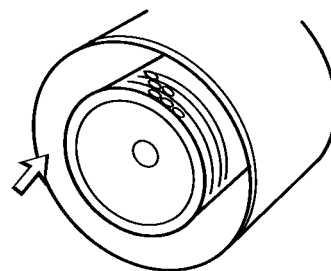


Illustration 180

g00101865

5. Cover the air inlet opening. Clean the inside of the air cleaner housing.
6. Inspect the gasket between the air inlet pipe and the air cleaner housing. Replace the gasket if the gasket is damaged.
7. Uncover the air inlet opening. Install a new secondary element.
8. Install the primary element and the air cleaner housing cover. Fasten the clips in order to secure the air cleaner housing cover.

i00081512

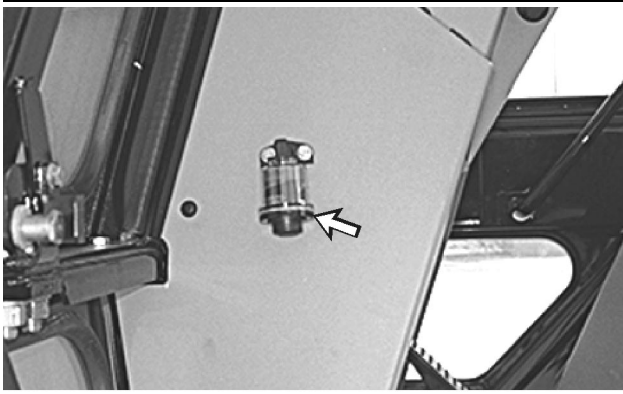


Illustration 181

g00105046

9. Reset the filter element indicator.
10. Replace the engine access panel.

Engine Air Filter Service Indicator - Inspect

SMCS Code: 1051; 1054; 7452

NOTICE

Service the air cleaner only with the engine stopped. Engine damage could result.

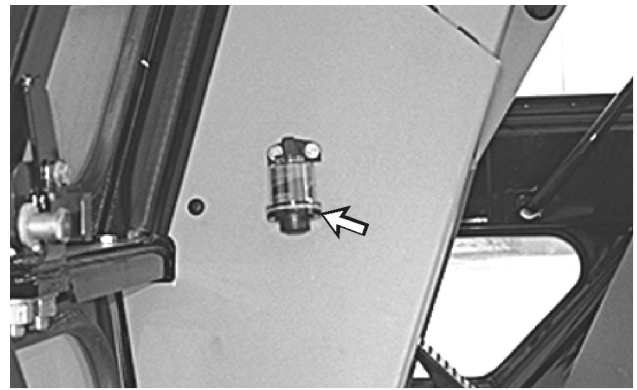


Illustration 182

g00105046

The filter service indicator is located on the left side of the dashboard in the cab.

Start the engine. Run the engine at high idle. If the yellow piston in the filter service indicator enters the red zone, service the air cleaner. Stop the engine.

i00081521

Engine Air Precleaner - Clean

SMCS Code: 1055



Illustration 183

g00105063

1. Empty the precleaner bowl whenever the dirt reaches the "FULL" mark.



Illustration 184

g00105066

2. Loosen the wing nut on the cover and remove the cover.
3. Empty the precleaner bowl. Wash the precleaner bowl and wash the cover.
4. Install the precleaner bowl and install the cover. Tighten the wing nut until the wing nut is only finger tight. Do not use a tool to tighten the wing nut.

i00081535

Engine Oil Level - Check

SMCS Code: 1302; 1318; 1326

NOTICE

Do not overfill the crankcase. Engine damage can result.



Illustration 185

g00105081

1. Open the engine access door on the left side of the machine.

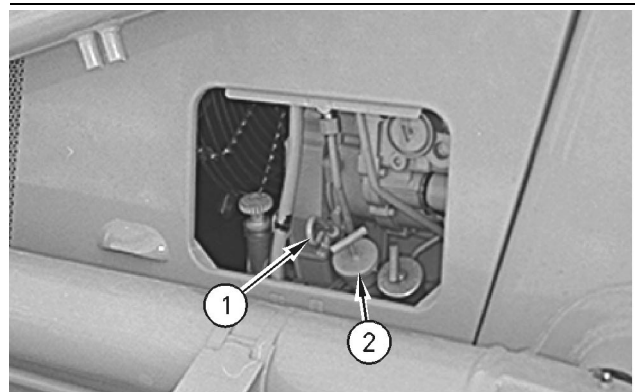


Illustration 186

g00105082

2. While the engine is stopped, maintain the oil level between the "ADD" mark and the "FULL" mark on the engine oil dipstick (1).
3. If necessary, remove the oil filler plug (2) and add oil.
4. Clean the oil filler plug and install the oil filler plug.
5. Close the engine access door.

i00091385

Hydraulic System Oil Level - Check

SMCS Code: 5056; 7479



Illustration 187

g00106776

The sight gauge for the hydraulic tank is located on the left side of the machine. Move the backhoe to the transport position and lower the loader bucket to the ground.

Turn off the engine. Wait about five minutes before you check the hydraulic system oil level.

Maintain the oil level in the sight gauge between the "ADD" mark and the "FULL" mark.



Illustration 188

g00105008

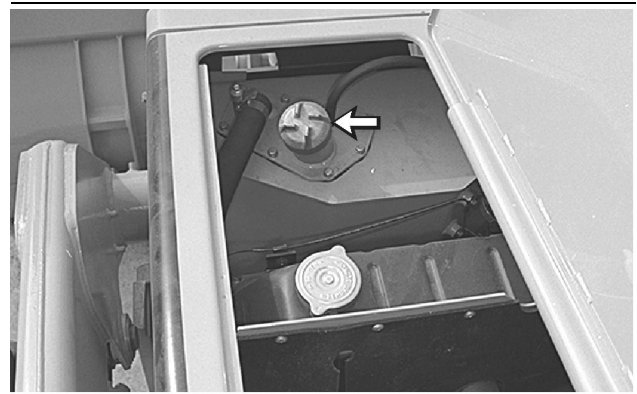


Illustration 189

g00106775

Open the access cover on the top of the engine compartment. Remove the cap in order to add hydraulic oil, if necessary.

i00091415

Loader Bucket, Cylinder, and Linkage Bearings - Lubricate

SMCS Code: 7069; 7070; 7071

Apply lubricant to the grease fitting (8) for the frame and for the lift arm. There is a grease fitting for each side of the machine.

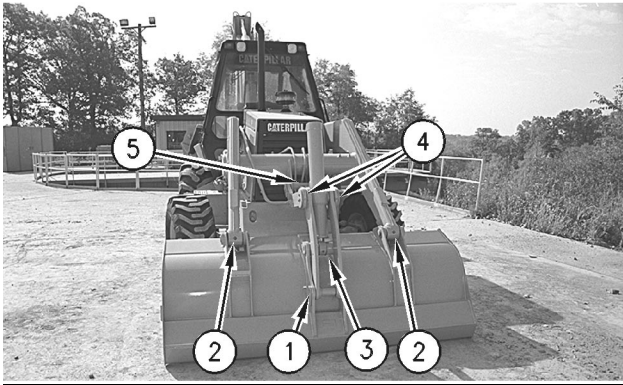


Illustration 190

g00106902

Apply lubricant to the grease fitting for the upper pivot pin (1).

Apply lubricant to the grease fittings for the lower pivot pins (2).

Apply lubricant to the grease fitting for the rod end of the tilt cylinder (3).

Apply lubricant to the grease fittings for the pivot bearings for the bucket tilt cylinder (4). There is a grease fitting in each linkage (four total).

Apply lubricant to the grease fitting for the pivot pin at the loader lift arm (5).



Illustration 191

g00106905

Apply lubricant to the grease fitting for the rod end of the lift cylinder (6). There is a grease fitting for each side of the machine.

Apply lubricant to the grease fitting for the head end of the lift cylinder (7). There is a grease fitting for each side of the machine.

i00317205

i00112917

Seat Belt - Inspect

SMCS Code: 7327

Always check the condition of the seat belt and the condition of the mounting hardware before you operate the machine. Replace any parts that are damaged or worn.

Regardless of the appearance of the seat belt, the seat belt should be replaced at every three year interval. A date label is attached to each seat belt. Use this label in order to determine the age of the seat belt.

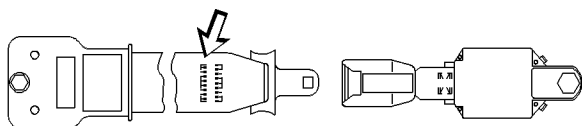


Illustration 192

g00215958

Inspect the seat belt for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Check the buckle for wear or for damage. If the buckle is worn or damaged, replace the seat belt and/or the buckle.

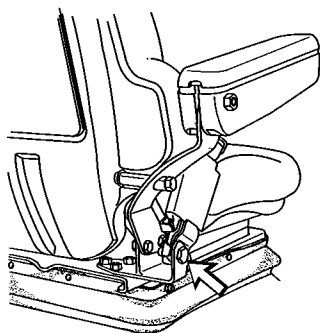


Illustration 193

g00038621

Check the seat belt mounting hardware for wear or for damage. If the seat belt mounting hardware is worn or damaged, replace the seat belt mounting hardware. Make sure that the mounting bolts are tight.

Secondary Steering Test (If Equipped)

SMCS Code: 4324

Note: With the machine at rest, the steering during this test cycle may require more effort than normal steering. Both hands may be required to steer.

Before you start the engine, turn the steering wheel while the vehicle weight is on the front wheels. Turn the front wheels from the center position to each stop and return to the center position. Failure of the front wheels to complete the above cycle indicates a malfunction of the secondary steering system. The machine should not be driven until the problem is corrected.

i00094916

Stabilizer and Cylinder Bearings - Lubricate

SMCS Code: 5468; 7222

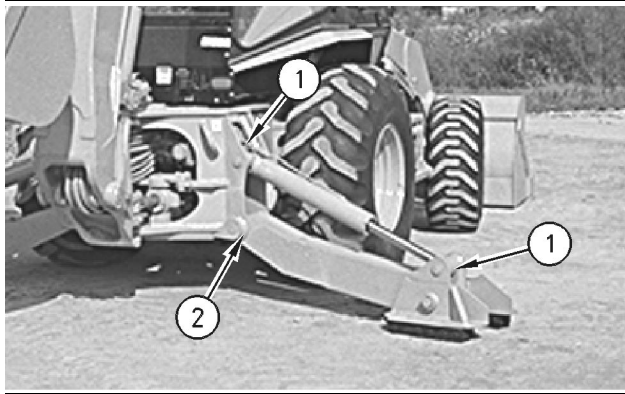


Illustration 194

g00107005

Position the stabilizer, as shown.

Apply lubricant to the grease fittings at each end of the cylinder (1).

Apply lubricant to the grease fitting for the pivot of the stabilizer (2).

Repeat for the other stabilizer.

There is a total of six grease fittings.

i00095009

Swing Frame and Cylinder Bearings - Lubricate

SMCS Code: 5105; 6506; 6507; 7063

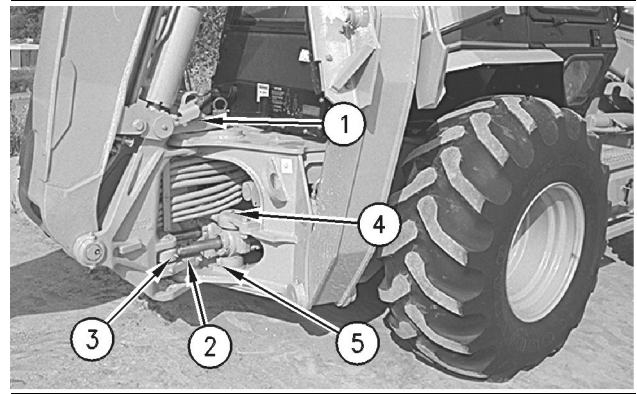


Illustration 195

g00107017

Apply lubricant to the grease fitting for the top swing pin (1).

Apply lubricant to the grease fitting for the bottom swing pin (2).

Apply lubricant to the grease fitting for the eye of the swing cylinder (3). Repeat for the other swing cylinder.

Apply lubricant to the grease fitting for the bearing on the top of the swing cylinder (4). Repeat for the other swing cylinder.

Apply lubricant to the grease fitting for the bearing on the bottom of the swing cylinder (5). Repeat for the other swing cylinder.

There is a total of eight grease fittings.

i00095063

Tire Inflation - Check

SMCS Code: 4203



Illustration 196

g00107022

Measure the tire pressure on each tire. Consult your Caterpillar dealer for the correct load rating and for the correct operating pressures.

Inflate the tires, if necessary. See Operation and Maintenance Manual, "Tire Inflation".

i00095361

Transmission Oil Level - Check

SMCS Code: 3030; 3080; 3081

Check the transmission oil level while the machine is on a level surface.



Illustration 197

g00105081

Remove the engine access door on the left side of the machine.

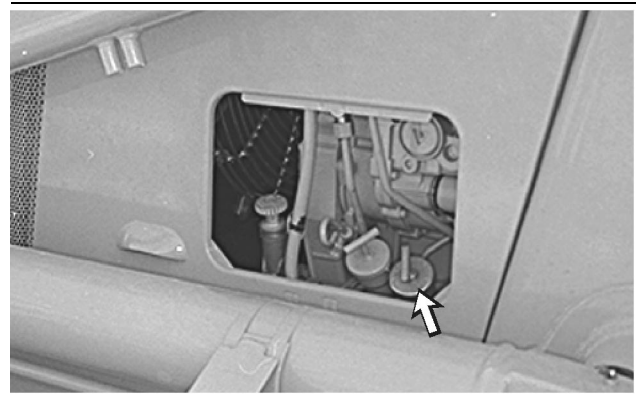


Illustration 198

g00107039

1. Maintain the transmission oil level between the "ADD" mark and the "FULL" mark on the dipstick when the transmission is warm. Add transmission oil, if necessary.
2. Clean the dipstick/fill plug and install the dipstick/fill plug.

i00095415

Walk-Around Inspection

SMCS Code: 7000

NOTICE

Accumulated grease and oil on a machine is a fire hazard. Remove this debris with steam cleaning or high pressure water, at least every 1000 hours or each time any significant quantity of oil is spilled on a machine.

Note: Inspect the machine for leaks. If leaks are observed, find the source of the leak and correct the leak. If leaks are suspected, check the fluid levels more frequently than the recommended intervals. If leaks are observed, check the fluid levels more frequently than the recommended intervals.

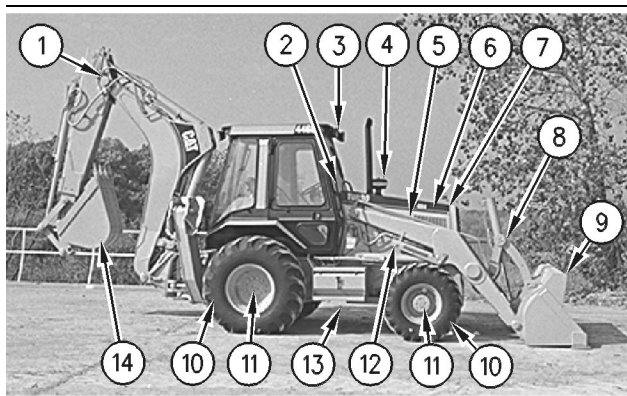


Illustration 199

g00107141

Inspect the backhoe bucket (14) for damage or for excessive wear. Inspect the backhoe linkage (1) for damage or for excessive wear. Repair the bucket or the linkage, if necessary. Replace any bucket teeth, if necessary.

Inspect the loader bucket (9) for damage or for excessive wear. Inspect the linkage (8) for damage or for excessive wear. Repair the bucket or the linkage, if necessary. Replace any bucket teeth, if necessary.

Inspect the transmission (13) for leaks. Inspect the torque converter for leaks. Correct any leaks. Check the hoses around the transmission.

Inspect the hydraulic system for leaks. Inspect the hydraulic tank (7), cylinder rod seals, hoses and tubes. Also inspect plugs, couplings and fittings. Correct any leaks.

Inspect the engine compartment (5) for trash buildup. Remove any trash buildup that is in the engine compartment. Clean the screens on the engine access doors.

Inspect the belts for the engine attachments (12) for worn belts, for cracked edges or for frayed edges. Replace any damaged belts.

Inspect the cooling system for leaks, for faulty hoses, and for trash buildup. Correct any leaks and remove any trash buildup from the radiator (6).

Inspect the tires (10) for damage and for proper inflation. Replace any missing valve caps. Tighten any loose bolts.

Inspect the axles (11) for leaks. Inspect the front differential for leaks and the rear differential for leaks.

Check the torque on new wheels or repaired wheels. Refer to Operation and Maintenance Manual, "Wheel Nut Torque - Check".

Inspect the engine precleaner bowl (4) for dirt buildup. Remove the dirt from the precleaner bowl when the dirt has accumulated close to the "FULL" line on the precleaner bowl.

Service the air filter elements when the yellow piston enters the red zone on the filter service indicator.

Inspect the steps and handholds (2). These objects must be clean. Also, these objects must be in good condition. Inspect the Rollover Protective Structure (ROPS) for damage. Notify your Caterpillar dealer for repairs, if necessary. Tighten any loose bolts on the ROPS.

Make sure that the access covers and the guards are secured. Inspect the access covers for damage and the guards for damage.

Inspect the lights (3) for broken bulbs and for broken lenses. Replace the bulbs or lenses, if necessary.

Inspect the operator's compartment for cleanliness. Keep the operator's compartment clean.

Adjust the rearview mirrors for best visibility.

i00095438

Wheel Nut Torque - Check

SMCS Code: 4051; 4199; 4200



Illustration 200

g00107226

Check the torque on new wheels or repaired wheels after every ten service hours until the specified torque is maintained.

Torque the nuts to 440 ± 40 N·m (325 ± 30 lb ft).

Check the nuts on all four wheels.

i00095456

Windows - Clean

SMCS Code: 7310; 7340



Illustration 201

g00107228

Use commercially available window cleaning solutions in order to clean the windows. Clean the outside of the windows from the ground unless handholds are available.

i00119137

Axle Universal Joint (Front) - Lubricate

SMCS Code: 3251



Illustration 202

g00107957

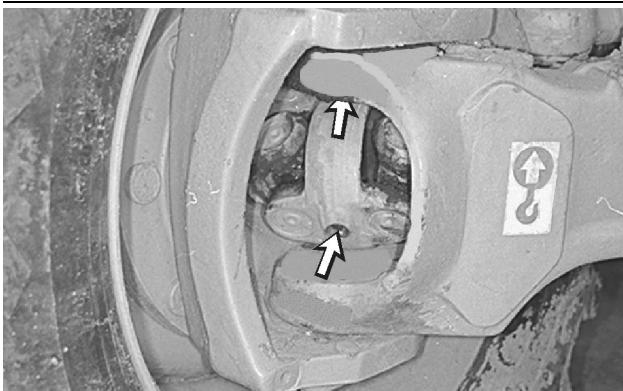


Illustration 203

g00107960

Apply lubricant to the grease fittings for the drive shaft to the final drives. There are two grease fittings for each drive shaft.

i00081140

Cab Air Filter - Clean/Replace

SMCS Code: 7311; 7342

Clean Filters

NOTICE

Do not clean the elements by bumping or tapping them.

Inspect the elements after cleaning. Do not use an element with damaged pleats, gaskets or seals.

When cleaning with pressure air, use 205 kPa (30 psi) maximum to prevent element damage by too much air pressure.

When cleaning with pressure water, use 280 kPa (40 psi) maximum to prevent element damage.

Note: Clean the filter elements more often in dusty conditions. If there is a noticeable reduction in the airflow from the air vents, check the filter elements.

External Filter Element



Illustration 204

g00104999

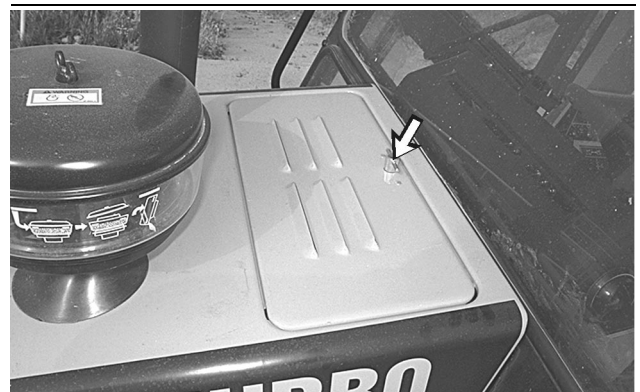


Illustration 205

g00105000

1. Open the access panel on the top of the engine compartment.

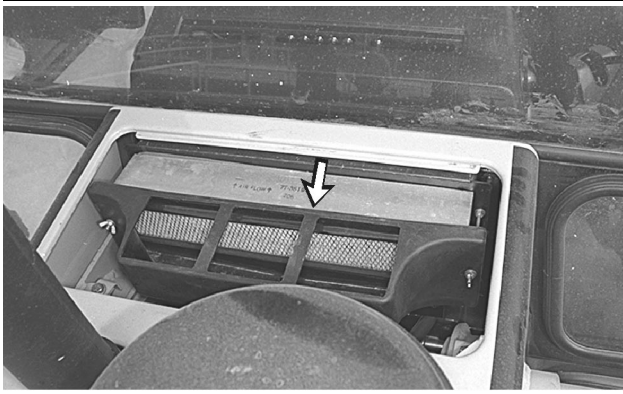


Illustration 206

g00105001

2. Remove the filter element and clean the filter element with compressed air or with pressure water. You can also wash the filter element with a solution of warm water and of a nonsudsing household detergent.

Do not wash the filter element while the filter element is installed on the machine.

3. Rinse the filter element in clean water. Air dry the filter element thoroughly.
4. Install the filter element and replace the access panel.

Recirculation Filter

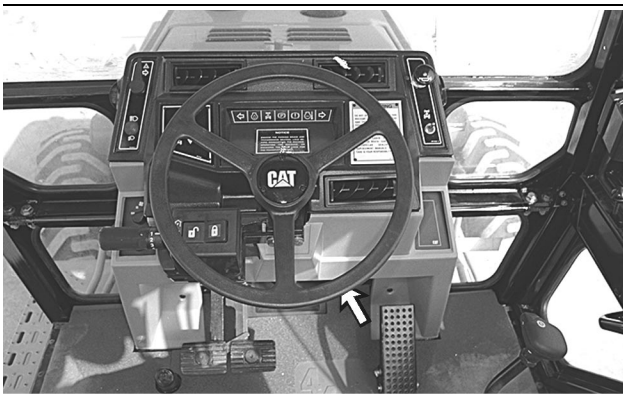


Illustration 207

g00105002

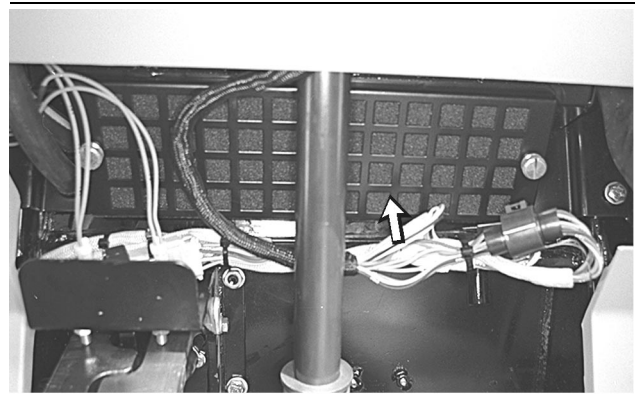


Illustration 208

g00105003

1. Remove the recirculation filter for the cab. The filter element is located under the dashboard.
2. Clean the filter element with compressed air or with pressure water. You can also wash the filter element with a solution of warm water and of a nonsudsing household detergent.
3. Rinse the filter element in clean water. Air dry the filter element thoroughly.
4. Install the filter.

i00091394

Kingpin Bearings - Lubricate

SMCS Code: 4314

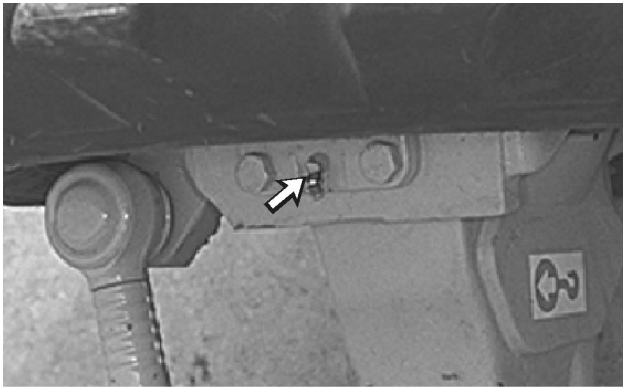


Illustration 209

g00106819

Fitting for the upper kingpin bearing



Illustration 210

g00106820

Fitting for the lower kingpin bearing

Apply lubricant to the four grease fittings for the kingpin bearings. There are two grease fittings for the left side and two grease fittings for the right side.

i00095642

Parking Brake - Check/Adjust

SMCS Code: 4267

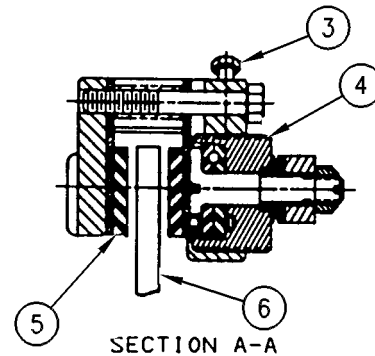
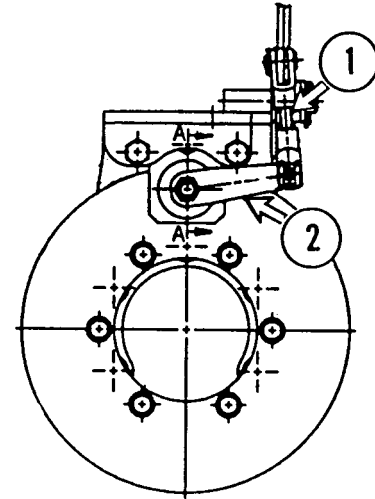


Illustration 211

g00107346

If the parking brake cannot hold the machine in fourth speed forward at full throttle, the caliper pads must be adjusted.

1. Chock the wheels and release the parking brake.
2. Remove the rod (1) from the caliper actuation lever (2).
3. Loosen the locking bolt (3) and adjust the modulating body (4) until the caliper pads (5) are tight on the brake disc.

i00081537

4. Back off the modulating body (4) to the first flat and tighten the locking bolt (3).
5. Install the caliper lever (2) so that the top of the lever is flush with the bottom of the mounting bracket (6) and the top of the lever is pointing to the left of the machine.
6. Install the rod (1).
7. Verify that the fully released position at the parking brake handle produces a fully released condition at the caliper. If necessary, repeat Step 2 through Step 6.

Engine Oil and Filter - Change

SMCS Code: 1302; 1318; 1326

Note: If the sulfur content in the fuel is greater than 1.5% by weight, use an oil with a TBN of 30. With the high sulfur fuel, change the oil and the filter element after every 100 hours or after every two weeks. Otherwise, change the oil and the filter element after every 250 hours or after every month.

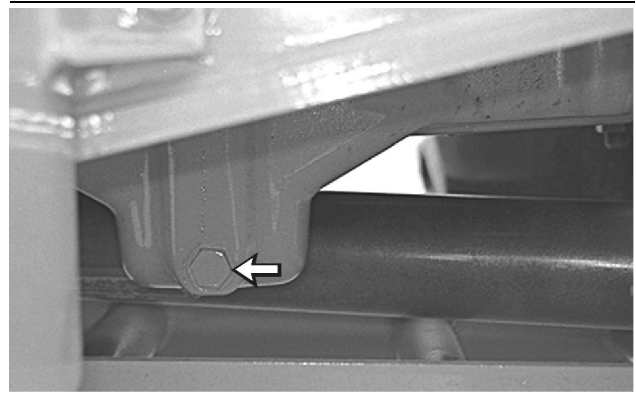


Illustration 212

g00105085

The crankcase drain plug is on the right side of the oil pan.

1. Remove the crankcase drain plug and drain the oil into a suitable container. Clean the crankcase drain plug and replace the crankcase drain plug.



Illustration 213

g00104955

2. Remove the engine access panel on the right side of the machine.

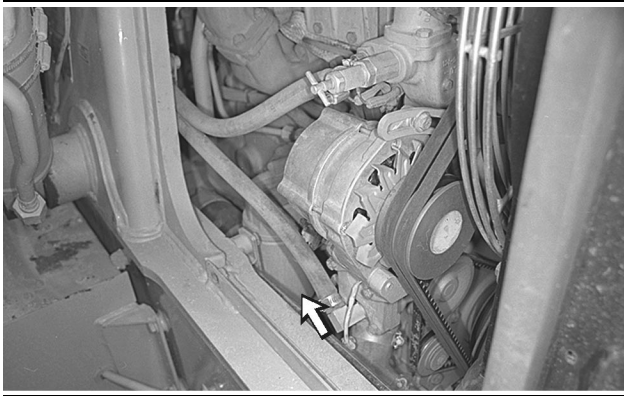


Illustration 214

g00105086

3. Remove the filter element with a strap type wrench. Refer to Operation and Maintenance Manual, "Oil Filter - Inspect".
4. Clean the filter mounting base with a clean cloth. Make sure that the old filter gasket has been removed.
5. Apply a thin film of clean engine oil to the sealing surface of the new filter element.
6. Install the new filter element by hand. When the gasket contacts the filter base, tighten the filter for an additional 3/4 turn.



Illustration 215

g00105081

7. Open the engine access door on the left side of the machine.

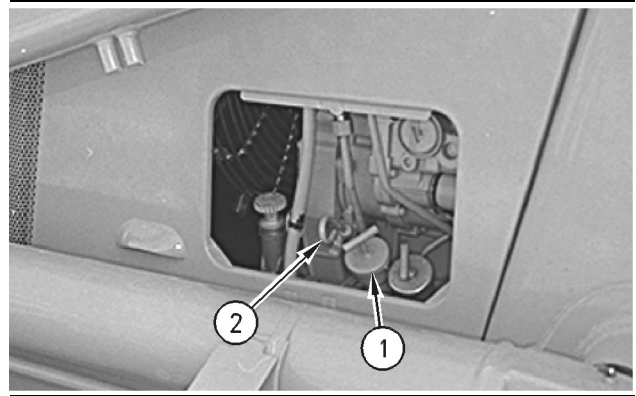


Illustration 216

g00105087

8. Remove the oil filler plug (1). Fill the crankcase with new oil. See Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities". Clean the oil filler plug and install the oil filler plug.
9. Start the engine and allow the oil to warm. Check for leaks.
10. Stop the engine and allow the oil to drain back into the oil pan. Maintain the oil level in the crosshatched region of the engine oil dipstick (2). Add oil, if necessary.
11. Close the engine access door and replace the engine access panel.

i00058667

Engine Valve Lash and Fuel Injector Timing - Check

SMCS Code: 1102

Refer to the Service Manual for the complete adjustment procedure for the engine valve lash.

Note: The correct fuel timing specification is found on the Engine Information Plate. Fuel timing specifications may vary for different engine applications and/or for different power ratings.

A qualified mechanic should adjust the engine valve lash and the fuel injector timing because special tools and training are required.

Refer to the Service Manual for the complete adjustment procedure for the fuel injector timing. Refer to your Caterpillar dealer for the complete adjustment procedure for the fuel injector timing.

i00079668

Air Conditioner - Test (If Equipped)

SMCS Code: 7320

NOTICE

Refrigerant in the air conditioner system can cause personal injury. Avoid any contact with refrigerant.

Check the refrigerant before warm weather begins. Check the refrigerant when the system does not work properly.

The system should be checked with pressure gauges by a qualified technician. Consult your Caterpillar dealer for proper installation when the system needs refrigerant.

Operate the air conditioner at least monthly in order to lubricate the compressor seals. Set the controls on MAXIMUM for 15 minutes.

i00079675

Air Conditioner Belt - Inspect/Adjust/Replace

SMCS Code: 1357; 7320

1. Stop the engine in order to inspect the air conditioner belt.



Illustration 217

g00105056

2. Remove the engine access panel on the left side of the machine.

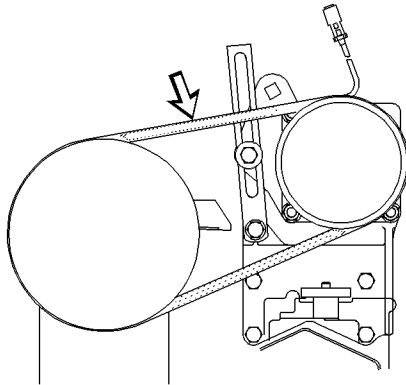


Illustration 218

g00107591

3. Inspect the condition of the air conditioner belt and the adjustment of the air conditioner belt. The air conditioner belt should deflect 14 to 20 mm (0.55 to 0.79 inch) under 110 N (25 lb) of force.

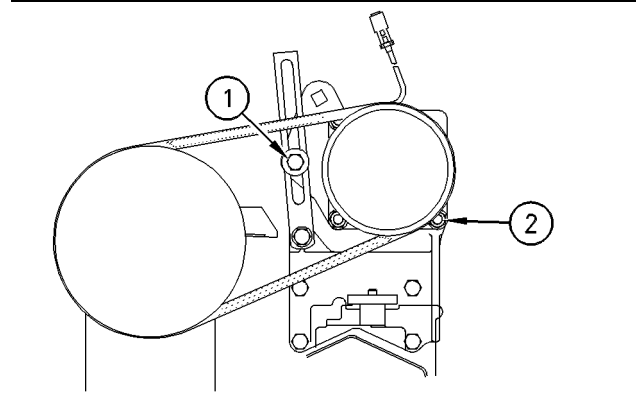


Illustration 219

g00107592

4. Loosen the adjusting locknut (1). Loosen the compressor bracket mounting bolt (2).
5. Move the compressor until the correct belt tension is reached.
6. Tighten the adjusting locknut (1). Tighten the compressor bracket mounting bolt (2).
7. Recheck the belt deflection. If the amount of deflection is incorrect, repeat Step 219 to Step 6.

i00079712

Alternator and Fan Belts - Inspect/Adjust/Replace

SMCS Code: 1357

If new belts are installed, check belt adjustment after 30 minutes of operation. For multiple belt drive applications, always replace the belts in matched sets. Replacing only one belt of a matched set will cause the new belt to carry more load because the older belts are stretched. The additional load on the new belt could cause the new belt to break.



Illustration 220

g00104955

1. Remove the access panel on the right side of the machine.

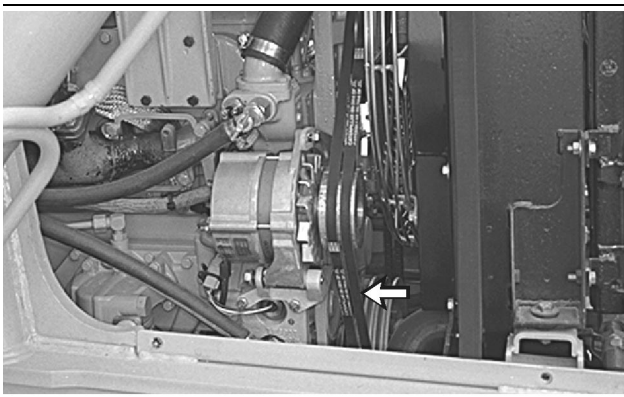


Illustration 221

g00104956

2. Inspect the condition of the alternator belts and the adjustment of the alternator belts. The alternator belts should deflect 14 to 20 mm (0.55 to 0.79 inch) under 110 N (25 lb) of force.

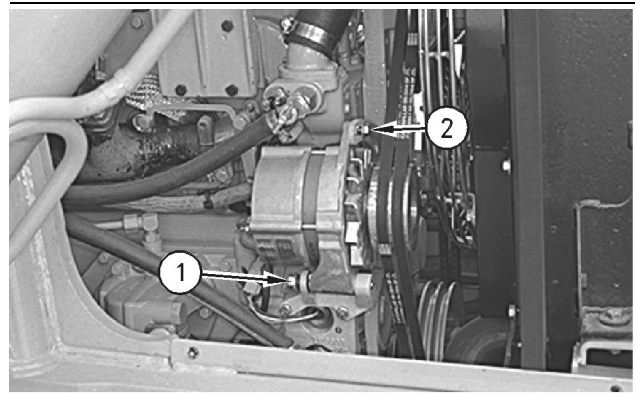


Illustration 222

g00104958

3. Loosen the mounting bolt (1). Loosen the adjusting locknut (2).
4. Move the alternator until the correct tension is reached.
5. Tighten the adjusting locknut (2). Tighten the mounting bolt (1).
6. Recheck the belt deflection. If the amount of deflection is incorrect, repeat Step 3 to Step 5.
7. Replace the access panel.

i00081332

Cooling System Coolant Additive (DEAC) - Add

SMCS Code: 1352; 1353; 1395

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

Note: This procedure pertains to Caterpillar Diesel Engine Antifreeze/Coolant (DEAC) only. This procedure does not pertain to machines that are shipped from the factory with Extended Life Coolant (ELC) and machines that are maintained with Extended Life Coolant (ELC).

See Operation and Maintenance Manual, "Cooling System Specification" for all cooling system requirements.

Use **8T-5296** Coolant Test Kit in order to check the concentration.

NOTICE

Excessive additive (greater than the recommended 6% initial fill) together with concentrations of antifreeze greater than 60% cause deposits to form and can result in radiator tube blockage and overheating.

Liquid Supplemental Coolant Additive



Illustration 223

g00105008

1. Open the access panel on the top of the engine compartment.



Illustration 224

g00105009

2. Slowly loosen the radiator cap in order to relieve system pressure. Remove the radiator cap.
3. If necessary, drain enough coolant from the radiator in order to allow the addition of the liquid coolant additive.
4. Add 0.24 Liters (.50 pint) of cooling system additive for every 38 Liters (10 US Gallons) of engine cooling capacity.
5. Maintain the coolant level within 13 mm (0.5 inch) from the bottom of the filler tube.
6. Install the radiator cap. Close the access panel.

i00081450

Differential Oil Level (Front) - Check

SMCS Code: 3258

The oil level/fill plug is located near the middle of the front axle.

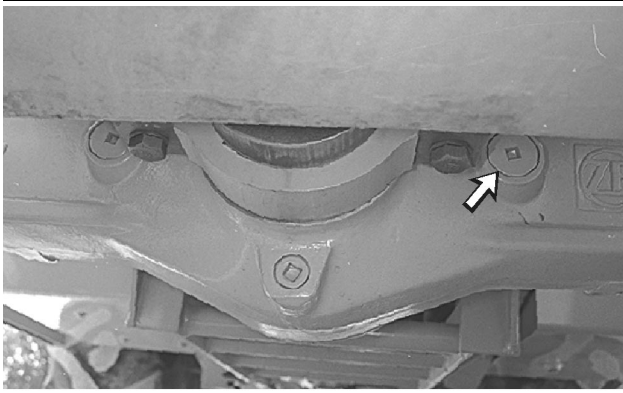


Illustration 225

g00105014

1. Remove the oil level/fill plug in order to check the oil.
2. The oil level should be at the bottom of the plug threads.
3. Clean the oil level/fill plug and install the oil level/fill plug.

i00081469

Differential Oil Level (Rear) - Check

SMCS Code: 3258

The oil level/fill plug is located near the middle of the rear axle.

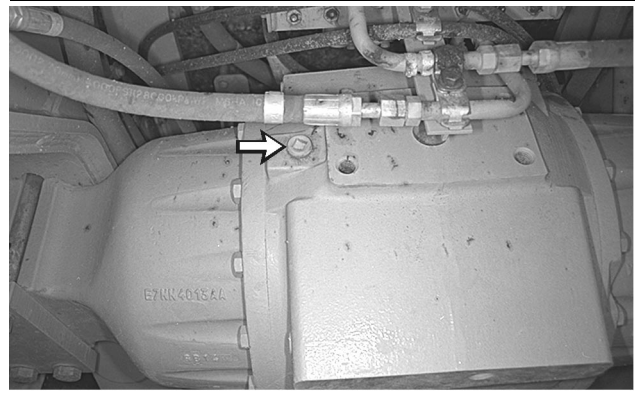


Illustration 226

g00105016

1. Remove the oil plug in order to check the oil.
2. The oil level should be at the bottom of the plug threads.
3. Clean the oil plug and install the oil plug.

i00081579

Extendable Stick - Inspect (If Equipped)

SMCS Code: 6533

Check the extendable stick for slop. Shim the extendable stick pads in order to maintain an acceptable fit and reduce slop. Consult the Service Manual for the correct procedure.

Note: Do not over apply a silicone based lubricant. Dirt can be attracted to the lubricant and dirt can cause abrasion to the pad assemblies and wear to the pad assemblies.

The extendable stick pads do not normally require any lubrication. If the extendable stick becomes noisy, a small amount of a silicone based lubricant may be applied.

i00081581

Final Drive Oil Level (Front) - Check

SMCS Code: 4050

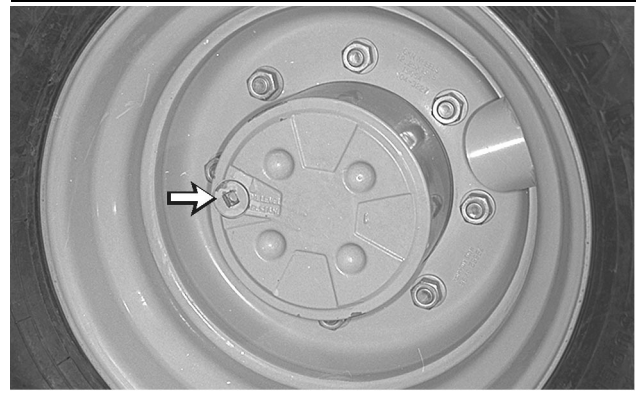


Illustration 227

g00105136

1. Position the oil fill/drain plug at a horizontal position in order to check the oil level.
2. Remove the oil fill/drain plug in order to check the oil level.
3. The oil should be level with the bottom of the plug threads.
4. Clean the plug and install the plug.
5. Repeat the procedure for the other final drive.

i00111650

Water Pump Belt - Inspect/Adjust/Replace

SMCS Code: 1357; 1361

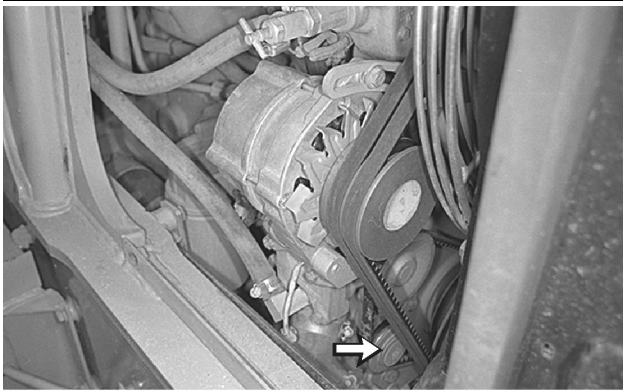


Illustration 228

g00107717

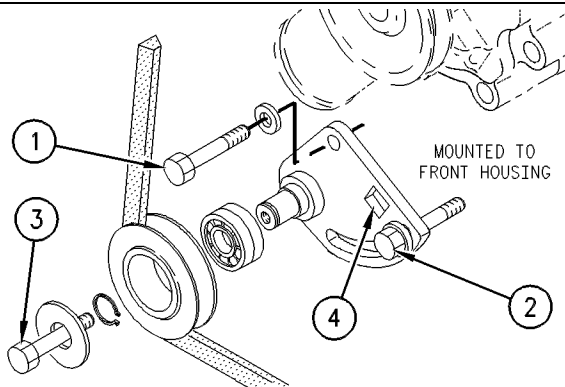


Illustration 229

g00107716

1. To adjust the water pump belt, loosen the mounting bolt (1) for the idler pulley and the bracket bolt (2) for the idler pulley.
2. Move the idler pulley in order to obtain the correct adjustment. The belt should deflect 13 to 19 mm (0.50 to 0.75 inch) under 110 N (25 lb) of force.
3. To make the correct adjustment, use the bolt (3) in the center of the idler pulley or use the square hole (4) in the mounting bracket.
4. Tighten the bracket bolt (2) and tighten the mounting bolt (1).
5. If a new belt is installed, check the belt tension again after 30 minutes of engine operation at rated speed.

i00081491

Drive Shaft Spline - Lubricate

SMCS Code: 3253



Illustration 230

g00105056

Remove the engine access panel on the left side of the machine.



Illustration 231

g00107954

Apply lubricant to the grease fitting for the drive shaft spline.

i00081486

Drive Shaft Universal Joint - Lubricate

SMCS Code: 3251; 3253

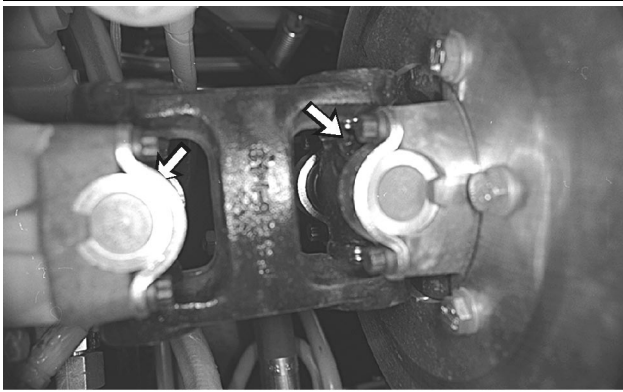


Illustration 232

g00107920

Apply lubricant to the grease fittings for the universal joints of the rear drive shaft. There are two grease fittings.

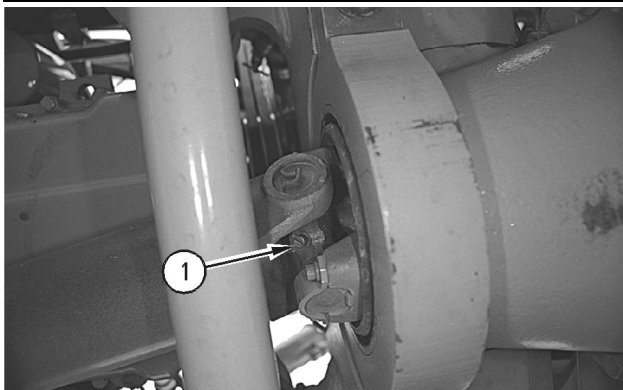


Illustration 233

g00107941

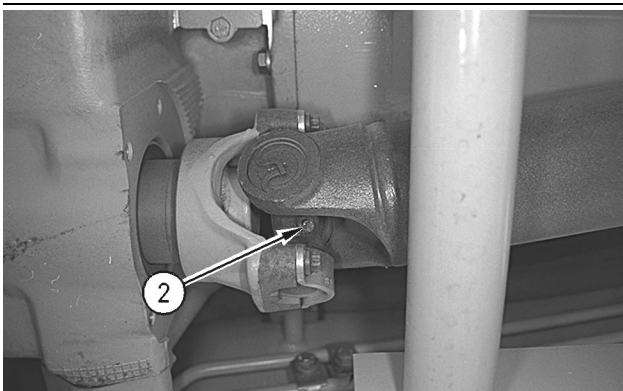


Illustration 234

g00107942

Apply lubricant to the grease fittings (1) and (2) for the universal joint of the front drive shaft.

i00081585

Fuel System Primary Filter - Replace

SMCS Code: 1260; 1261



Illustration 235

g00107638

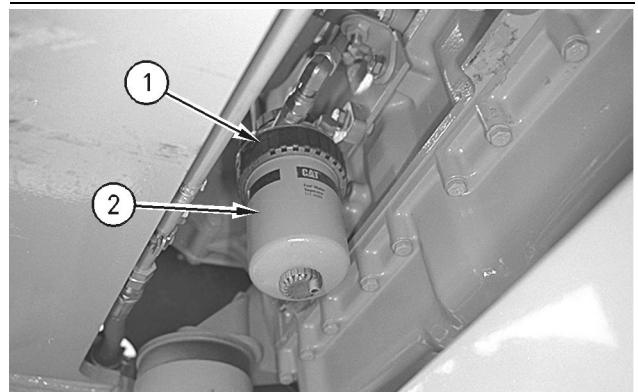


Illustration 236

g00107637

1. Loosen collar (1).
2. Remove fuel filter (2) and discard fuel filter (2).

Note: Always obey local regulations when you discard drained fluids and used filters.

3. Clean the inside surfaces of the filter head.
4. Inspect the seal of the filter head. Replace the seal if the seal is worn or damaged.

NOTICE

Do not fill fuel filters with fuel before installing them. Contaminated fuel will cause accelerated wear to fuel system parts. Fuel system should be primed prior to starting the engine.

5. Install a new fuel filter. Tighten collar (1) in order to secure the fuel filter.

i00117896

Fuel System Secondary Filter - Replace

SMCS Code: 1261

7. Replace the engine access panel.



Illustration 237

g00105056

1. Remove the engine access panel on the left side of the machine.

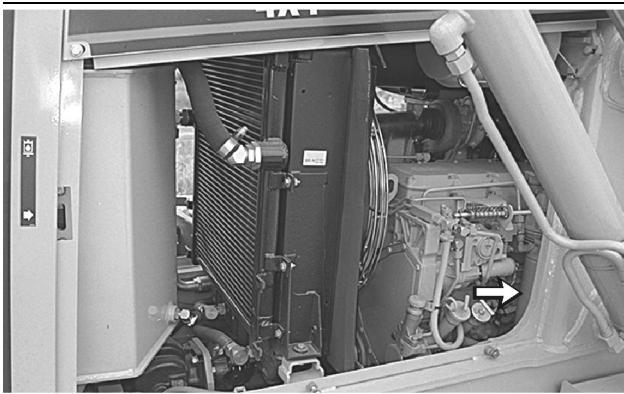


Illustration 238

g00107648

2. Remove the fuel filter. Inspect the fuel filter for debris by cutting the filter open. Discard the filter properly.
3. Clean the mounting base of the fuel filter. Remove any part of the old seal that remains on the mounting base of the fuel filter.
4. Coat the seal of the new fuel filter with clean diesel fuel.
5. Install the new fuel filter by hand. When the seal contacts the base, tighten the filter for an additional three quarters of a turn.
6. Prime the fuel system. Refer to Operation and Maintenance Manual, "Fuel System - Prime".

i00091375

Hydraulic System Oil Filter - Replace

SMCS Code: 5056; 5068



Illustration 239

g00105008

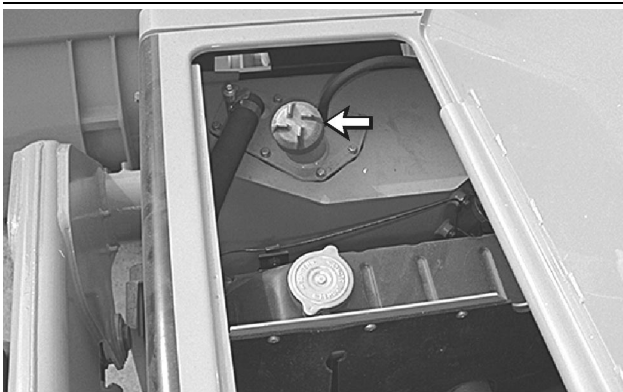


Illustration 240

g00106775

1. Remove the hydraulic tank filler cap that is located under the access panel on the top of the engine compartment.



Illustration 241

g00106814

2. The hydraulic oil filter is located on the right side of the machine.



Illustration 242

g00106815

3. Remove the filter element with a strap type wrench.
4. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.
5. Apply a light coat of oil to the gasket of the new filter element.
6. Install the new filter element by hand. When the gasket contacts the filter element mounting base, tighten the filter element for an additional three quarters of a turn.
7. Remove the hydraulic tank breather. Replace the old breather with a new breather.



Illustration 243

g00106776

8. Maintain the hydraulic oil level in the sight gauge between the "ADD" mark and the "FULL" mark. Add oil, if necessary.
9. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.
10. Install the hydraulic tank filler cap.
11. Replace the access panel.

i00095358

Transmission Oil Filter - Replace

SMCS Code: 3067



Illustration 244

g00107040

The transmission filter is located on the right side of the machine .

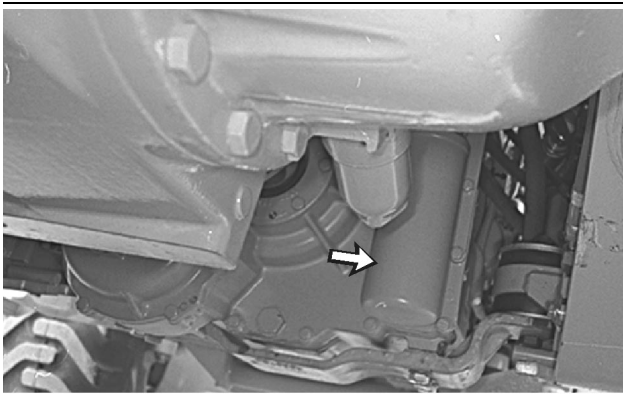


Illustration 245

g00107041

1. Remove the transmission oil filter element with a strap type wrench.
2. Clean the filter element mounting base. Remove any part of the filter element gasket that remains on the filter element mounting base.
3. Apply a light coat of oil to the gasket of the new filter element.
4. Install the new filter element by hand. When the gasket contacts the mounting base, tighten the filter element for an additional three quarters of a turn.
5. Start the engine and apply the service brake. Slowly operate the transmission controls in order to circulate the transmission oil.

6. Move the transmission control lever to NEUTRAL and engage the parking. Inspect the filter element for leaks.

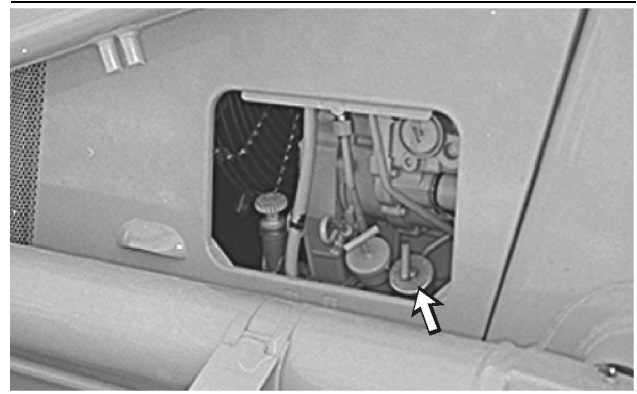


Illustration 246

g00107039

7. Maintain the transmission oil level between the "ADD" mark and the "FULL" mark on the dipstick when the transmission is warm. Add transmission oil, if necessary.
8. Stop the engine.

i00081397

Differential Oil (Front) - Change

SMCS Code: 3258

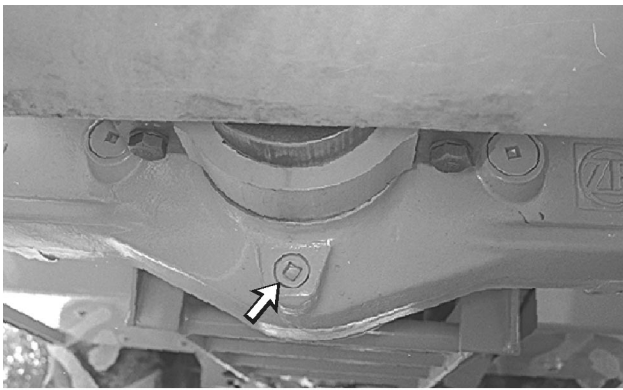


Illustration 247

g00105013

1. Remove the oil drain plug and drain the oil into a suitable container.
2. Clean the drain plug and install the drain plug.

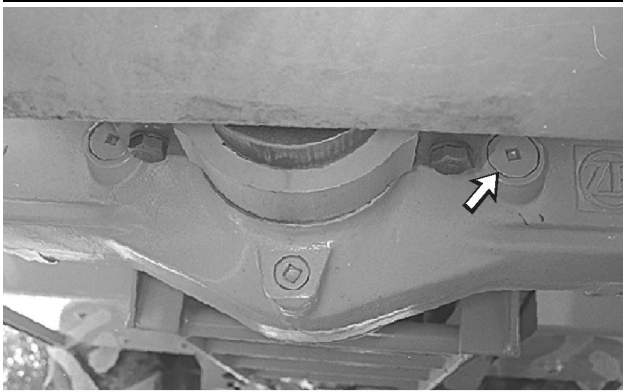


Illustration 248

g00105014

3. Remove the oil level/fill plug. Refer to Operation and Maintenance Manual, "Lubricant Specifications" and Operation and Maintenance Manual, "Refill Capacities" for oil.
4. Add oil until the oil is level with the threads for the fill plug.
5. Clean the fill plug and install the fill plug.

i00119351

Differential Oil (Rear) - Change

SMCS Code: 3258

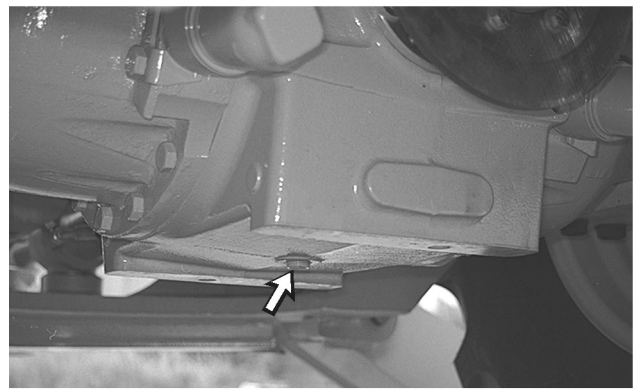


Illustration 249

g00105015

1. Remove the oil drain plug and drain the oil into a suitable container.
2. Clean the drain plug and install the drain plug.

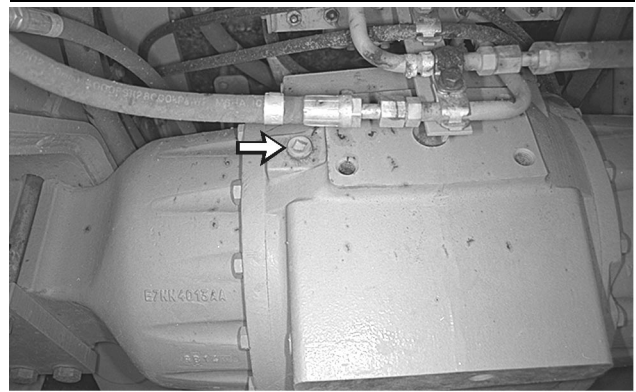


Illustration 250

g00105016

3. Remove the oil level/fill plug. Refer to Operation and Maintenance Manual, "Lubricant Specifications" and Operation and Maintenance Manual, "Refill Capacities" for oil.
4. Add oil until the oil is level with the threads for the fill plug.
5. Clean the fill plug and install the fill plug.

i00081526

Engine Crankcase Breather - Clean

SMCS Code: 1317



Illustration 251

g00105056

Remove the engine access panel on the left side of the machine.

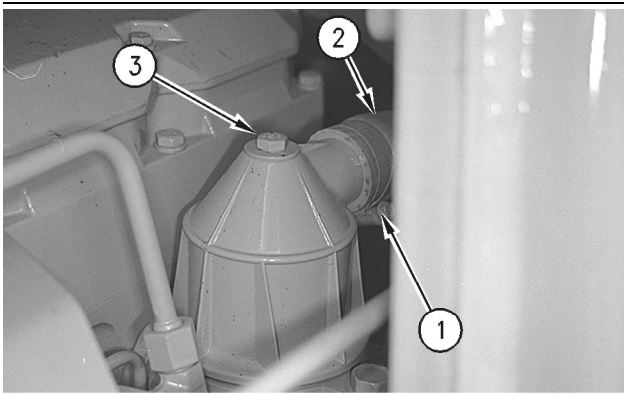


Illustration 252

g00105069

The breather is located below the air cleaner.

6. Inspect the breather hose for damage. Replace the breather hose, if necessary.
 7. Install the breather element. Install the breather element cover assembly.
 8. Install the breather hose and breather outlet hose clamp.
 9. Replace the engine access panel.
1. Loosen the breather outlet hose clamp (1). Remove the breather hose (2) from the breather cover.
 2. Remove the breather element cover assembly (3).
 3. Check the condition of the cover seal. If the used seal is damaged, replace the seal with a new seal.
 4. Wash the element in a clean, nonflammable solvent. Wash the breather element cover assembly in a clean, nonflammable solvent.
 5. Shake the element in order to dry the element. Pressure air may also be used to dry the element.

i00081580

Final Drive Oil (Front) - Change

SMCS Code: 4050

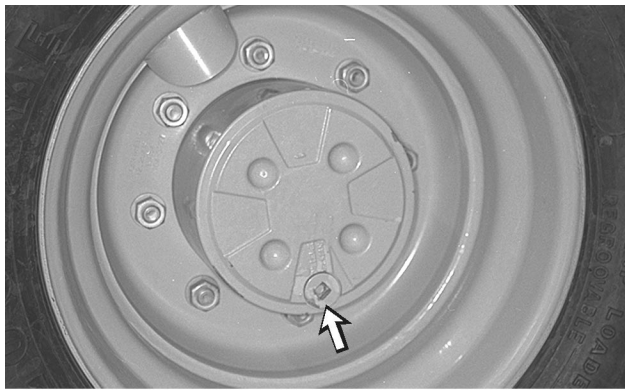


Illustration 253

g00105137

1. Position the oil fill/drain plug at the bottom.
Remove the oil fill/drain plug and drain the oil into a suitable container.

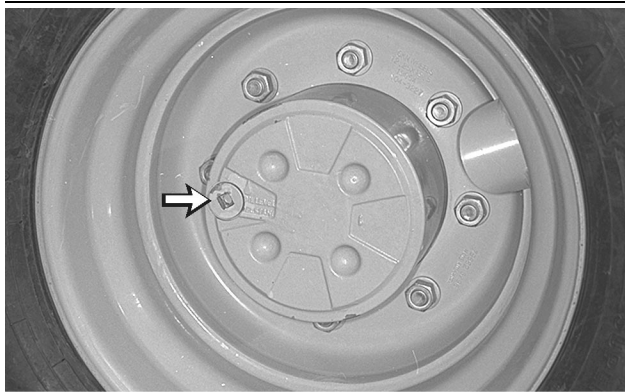


Illustration 254

g00105136

2. Position the plug hole at a horizontal position.
Use the line on the final drive as a reference.
3. Add oil until the oil is level with the plug threads.
Refer to Operation and Maintenance Manual, "Lubricant Specifications" and Operation and Maintenance Manual, "Refill Capacities" for the oil.
4. Clean the plug and install the plug.
5. Repeat the procedure for the other final drive.

i00119141

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7325

1. Remove the access covers from both sides of the ROPS.
2. Inspect the ROPS for loose bolts or for damaged bolts. Replace any damaged bolts or missing bolts with original equipment parts only.

Tighten the M16 bolts to a torque of 240 ± 40 N·m (175 ± 30 lb ft). Tighten the M30 bolts to a torque of 1600 ± 200 N·m (1200 ± 150 lb ft).

Note: Apply oil to all ROPS bolt threads before you install the bolts. Failure to apply oil to the bolt threads can result in improper bolt torque.

3. Operate the machine on a rough surface.
Replace the ROPS mounting supports if the ROPS emits a noise. Replace the ROPS mounting supports if the ROPS rattles.

4. Install the access covers.

Do not straighten the ROPS. Do not repair the ROPS by welding reinforcement plates to the ROPS.

Consult your Caterpillar dealer for repair of any cracks in the ROPS.

i00094956

Transmission Magnetic Screen - Clean

SMCS Code: 3030

1. Drain the transmission oil. See Operation and Maintenance Manual, "Transmission Oil - Change".

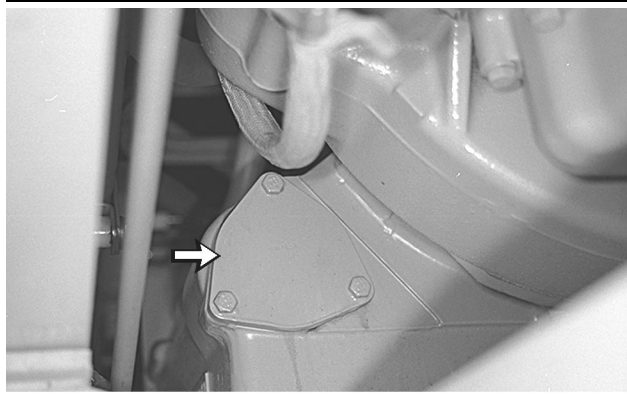


Illustration 255

g00107029

2. Remove the magnetic strainer cover.
3. Remove the magnets from the housing.
4. Remove the screen from the housing.
5. Wash the tube and the screen in a clean, nonflammable solvent.

NOTICE

Do not drop or rap the magnets against any hard objects. Replace any damaged magnets.

6. Clean the magnets with a cloth, with a stiff bristle brush, or with pressure air.
7. Install the magnets and the tube assembly into the magnetic screen.
8. Install the magnetic screen.
9. Clean the cover and inspect the seal. Replace the seal, if the seal is damaged.
10. Install the cover. Tighten the cover bolts.
11. Fill the transmission. See Operation and Maintenance Manual, "Transmission Oil - Change".

i00095354

Transmission Oil - Change

SMCS Code: 3030; 3080

Operate the machine for a few minutes in order to warm the transmission oil.

The machine should be level. Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.

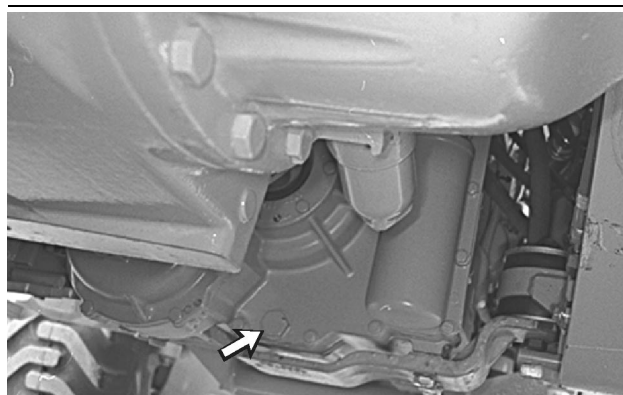


Illustration 256

g00107038

1. Remove the transmission drain plug. Allow the transmission oil to drain into a suitable container. Clean the transmission drain plug and install the transmission drain plug.
2. Change the transmission oil filter element. Refer to Operation and Maintenance Manual, "Transmission Oil Filter - Replace".
3. Clean the transmission magnetic screen. Refer to Operation and Maintenance Manual, "Transmission Magnetic Screen - Clean".



Illustration 257

g00105081

4. Remove the engine access door on the left side of the machine.

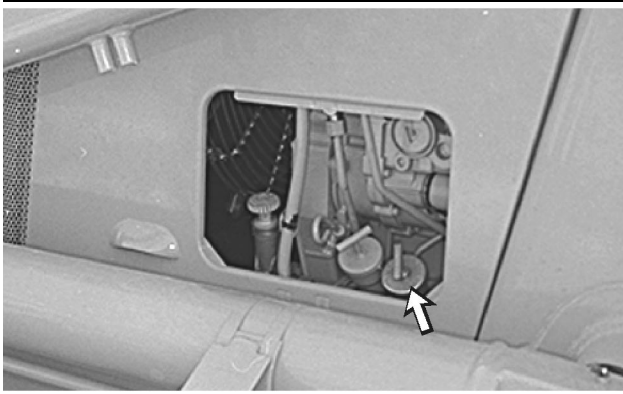


Illustration 258

g00107039

5. Remove the dipstick/fill cap and fill the transmission with transmission oil. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities".
6. Start the engine and run the engine at low idle. Apply the service brake. Slowly operate the transmission controls in order to circulate the oil.
7. Move the transmission control lever to NEUTRAL and engage the parking brake. Inspect the transmission for leaks.
8. Maintain the transmission oil level between the "ADD" mark and the "FULL" mark on the dipstick when the transmission is warm. Add transmission oil through the transmission filler tube, if necessary.
9. Install the dipstick/fill cap and install the engine access door.
10. Stop the engine.

Wheel Bearings (Front) - Lubricate

SMCS Code: 4205; 4208

Use the following procedure for both wheels.

1. Raise the front wheels slightly off the ground.
2. Install sufficient blocking under the frame and lower the machine to the blocking.
3. Remove the nuts and both wheels.

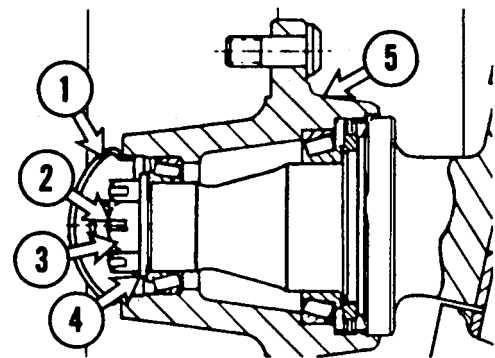


Illustration 259

g00107659

4. Remove the hub cap (1).
5. Remove the cotter pin (2), nut (3), and washer (4).
6. Pull the hub assembly (5) until the cone and roller assembly come out of the hub assembly. Then, pull off the hub all the way.
7. Clean all of the parts in clean, nonflammable solvent and allow the parts to air dry. Do not use pressure air.
8. Inspect the roller assemblies for heat discoloration and for wear. Inspect the seals for damage. Replace any damaged parts.
9. Make sure that the grease gets packed between the rollers and the cage on both bearings.

Force the grease through the bearing from the large end of the rollers.
10. Pack a 6 mm (0.25 inch) layer of grease between the bearing assemblies in the hub. Do not fully pack the hub with grease.
11. Apply a 6 mm (0.25 inch) thick film of grease on the spindle surface.

i00081531

12. Install the hub, the bearings, the washer, the nut and the wheel.
13. While you turn the wheel, tighten the nut (3) until a slight drag is noticed. Back off the nut to the nearest slot and install the cotter pin.
14. All bearing surfaces must make contact. The wheel should turn freely within 0.025 to 0.25 mm (0.001 to 0.010 inch) end play.
15. Install the hub cap.
16. Tighten the lug nuts to a torque of 440 ± 40 N·m (325 ± 30 lb ft).

Engine Governor Screen - Inspect/Clean/Replace

SMCS Code: 1264



Illustration 260

g00105056

Remove the engine access panel on the left side of the machine.

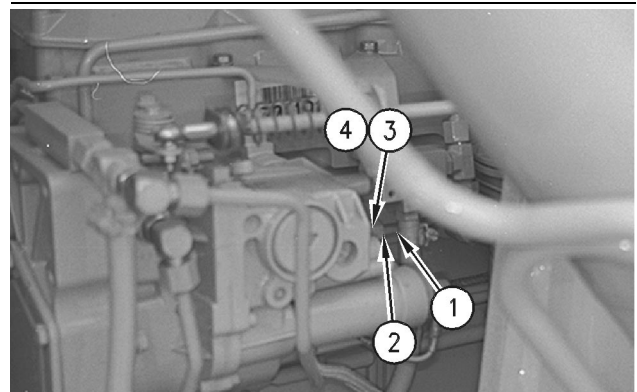


Illustration 261

g00107603

1. Remove the oil supply tube (1) from the cylinder head.
2. Remove the fitting (2) from the governor housing and remove the seal (3) from the governor housing.
3. Use a 6 mm hexagon wrench to remove the governor screen (4).
4. Wash the screen in solvent in order to remove any debris. Inspect the screen for damage. Inspect the seals for damage. Replace the screen and/or the seals, if necessary.
5. Install the screen far enough into the governor housing in order to allow clearance for the seals and for the fitting.
6. Install the seal, the fitting, and the oil supply tube.

i00091363

Hydraulic System Oil - Change

SMCS Code: 5056

Operate the machine for a few minutes in order to warm the hydraulic system oil.

The machine should be level. Lower the bucket to the ground and apply slight downward pressure. Engage the parking brake and stop the engine.



Illustration 262

g00105008

The hydraulic tank filler cap is located under the access panel on the top of the engine compartment.

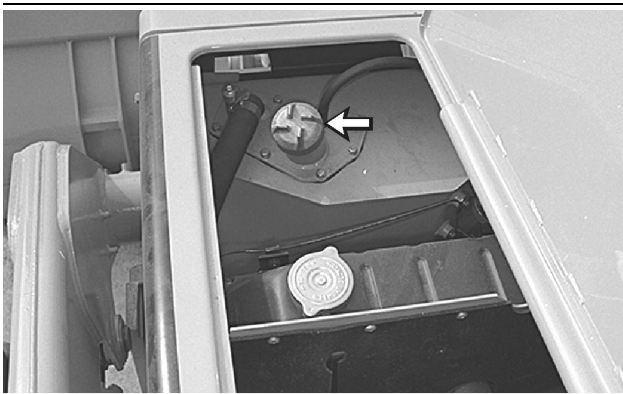


Illustration 263

g00106775

1. Remove the hydraulic tank filler cap.



Illustration 264

g00104955

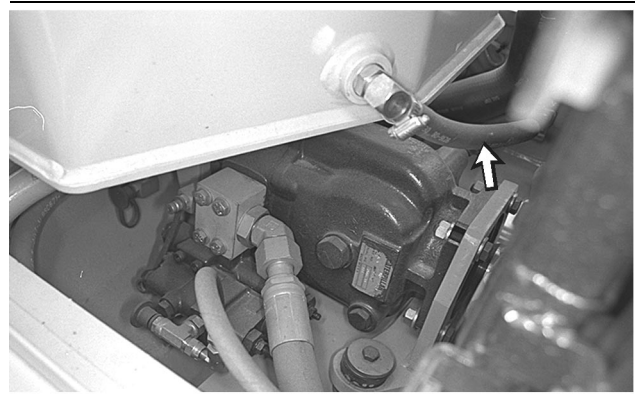


Illustration 265

g00106773

2. Remove the lower hydraulic hose in order to drain the hydraulic oil into a suitable container. An appropriate evacuation system can be used to remove the hydraulic oil.
3. If the lower hydraulic hose was removed, replace the hydraulic hose.
4. Change the hydraulic system filter and the hydraulic tank breather. Refer to Operation and Maintenance Manual, "Hydraulic System Oil Filter - Change".
5. Fill the hydraulic system oil tank. Refer to Operation and Maintenance Manual, "Lubricant Viscosities" and Operation and Maintenance Manual, "Refill Capacities".

i00081314



Illustration 266

g00106776

6. Maintain the hydraulic oil level in the sight gauge between the "ADD" mark and the "FULL" mark.

Check the hydraulic oil level with the loader on the ground and with the backhoe in the transport position.

Note: The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction hoses and hose clamps.

7. Inspect the gasket on the hydraulic tank filler cap for damage. Replace the gasket, if necessary.
8. Install the hydraulic tank filler cap.
9. Replace the access panel.

Cooling System Coolant (DEAC) - Change

SMCS Code: 1352; 1353; 1395

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

Note: This procedure pertains to Caterpillar Diesel Engine Antifreeze/Coolant (DEAC) only. This does not pertain to machines that shipped from the factory with Extended Life Coolant (ELC) and are maintained with Extended Life Coolant (ELC).

NOTICE

Do not change the coolant until you read and understand the material in the Cooling System Specifications section.

Drain the coolant whenever the coolant is dirty or whenever foaming is observed.



Illustration 267

g00105008

The radiator cap is located under the access panel on the top of the engine compartment.

1. Open the access panel on the top of the engine compartment.



Illustration 268

g00105009

2. Slowly loosen the radiator cap in order to relieve system pressure. Remove the radiator cap.

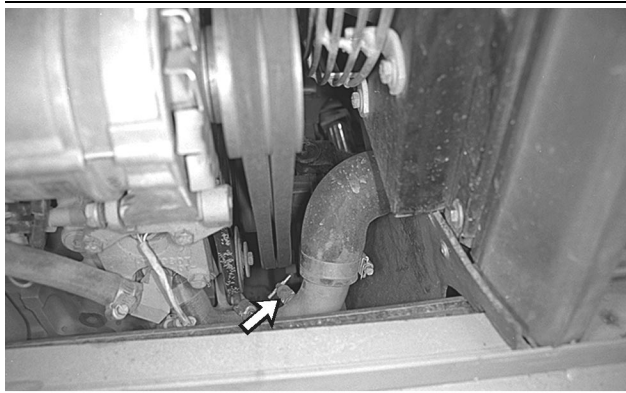


Illustration 269

g00107293

3. Remove the access panel on the right side of the engine compartment. The drain valve is located on the lower tube assembly of the radiator. Open the drain valve. Allow the coolant to drain into a suitable container.
4. Close the drain valve. Fill the system with a solution which consists of clean water and of cooling system cleaner. The concentration of the cooling system cleaner in the solution should be between 6 percent and 10 percent.
5. Start the engine. Run the engine for 90 minutes. Stop the engine. Drain the cleaning solution into a suitable container.
6. While the engine is stopped, flush the system with water. Flush the system until the draining water is transparent.
7. Close the drain valve.
8. Add the coolant solution. See the following topics:

- Operation and Maintenance Manual, "Cooling System Specifications"
- Operation and Maintenance Manual, "Refill Capacities"

Note: If you are using Caterpillar antifreeze, do not add the supplemental coolant additive at this time and/or change the element at this time.

9. Start the engine. Run the engine without the radiator cap until the thermostat opens and the coolant level stabilizes.
10. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the filler pipe.
11. Install the radiator cap. Replace the radiator cap if the gasket is damaged.
12. Stop the engine.
13. Close the access door. Replace the access panel.

i00095664

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352; 1353; 1395

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loose the cap slowly to relieve the pressure.

When a Caterpillar Extended Life Coolant is used, an extender must be added to the cooling system. See the Operation and Maintenance Manual, "Maintenance Interval Schedule" for the proper service interval. The amount of extender is determined by the cooling system capacity.

Table 29

RECOMMENDED AMOUNT OF EXTENDER BY COOLING SYSTEM CAPACITY	
Cooling System Capacity	Recommended Amount of Extender
22 to 30 L (6 to 8 US gal)	0.57 L (.60 qt)
30 to 38 L (8 to 10 US gal)	0.71 L (.75 qt)
38 to 49 L (10 to 13 US gal)	0.95 L (.95 qt)
49 to 64 L (13 to 17 US gal)	1.18 L (1.25 qt)

For additional information on the addition of extender, see Operation and Maintenance Manual, "Caterpillar Coolant Recommendations" or consult your Caterpillar dealer.

i00081359

Cooling System Water Temperature Regulator - Clean/Replace

SMCS Code: 1355; 1393

Replace the thermostat on a regular basis in order to reduce the chance of unscheduled downtime and of problems with the cooling system. Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

The thermostat should be replaced after the cooling system has been cleaned. Replace the thermostat while the cooling system is completely drained or while the cooling system coolant is drained to a level that is below the thermostat housing.

Note: If you are only replacing the thermostat, drain the cooling system coolant to a level that is below the thermostat housing.

Caterpillar engines incorporate a shunt design cooling system. It is mandatory to always operate the engine with a thermostat.

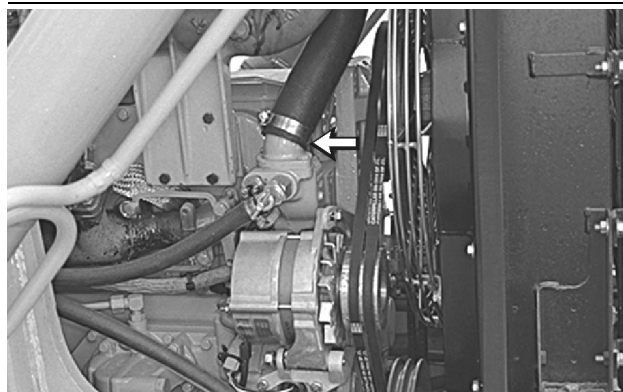


Illustration 270

g00105011

1. Loosen the hose clamp and remove the hose from the thermostat housing assembly.
2. Remove the bolts from the thermostat housing assembly. Remove the thermostat housing assembly.
3. Remove the gasket, the thermostat, and the seal from the thermostat housing assembly.
4. Install a new seal in the thermostat housing assembly. Install a new thermostat and a new gasket. Install the thermostat housing assembly on the engine cylinder head.

The thermostats can be reused under the following conditions.

- The thermostat is tested and the thermostat meets test specifications.
 - The thermostat is not damaged.
 - The thermostat does not have excessive buildup of deposits.
5. Install the hose. Tighten the hose clamp.
6. Refill the cooling system. See Operation and Maintenance Manual, "Cooling System Specifications" and Operation and Maintenance Manual, "Refill Capacities".

i00095660

Cooling System Coolant (ELC) - Change

SMCS Code: 1353; 1395

WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

NOTICE

Mixing ELC with other products will reduce the effectiveness of the coolant.

This could result in damage to cooling system components.

If Caterpillar products are not available and commercial products must be used, make sure they have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants and Caterpillar Extender.

For information about the addition of Extender to your cooling system, see the Operation and Maintenance Manual, "Cooling System Extended Life Coolant Extender - Add" or consult your Caterpillar dealer.

Flushing the Extended Life Coolant From the Cooling System

Some engines utilize Extended Life Coolant. See the Operation and Maintenance Manual, "Maintenance Interval Schedule" in order to determine the service interval. If a Extended Life Coolant was previously used, flush the cooling system with clean water. No other cleaning agents are required.

Flushing a Standard Coolant From the Cooling System

If you change the coolant of a machine to Extended Life Coolant from another type of coolant, use a Caterpillar cleaning agent to flush the cooling system. After you drain the cooling system, thoroughly flush the cooling system with clean water. **All of the cleaning agent must be removed from the cooling system.**

Note: See the Operation and Maintenance Manual, "Cooling System Coolant (DEAC) - Change" for the draining procedure and for the flushing procedure.